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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**POLICY IN CONFLICT: THE STRUGGLE
BETWEEN ENVIRONMENTAL POLICY
AND HOMELAND SECURITY GOALS**

by

Daniel R. Cowden

September 2013

Thesis Co-Advisors:

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**POLICY IN CONFLICT: THE STRUGGLE BETWEEN
ENVIRONMENTAL POLICY AND HOMELAND SECURITY GOALS**

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ABSTRACT

Since the 1970s, every American president and many Congressional leaders have called for “national energy independence” as a top policy priority. Among many reasons the United States (U.S). has been unable to deliver on this goal over four decades are certain environmental policies that may tend to inhibit efficiency in fuel consumption of vehicles. This study examines the unintended consequences of certain environmental policies for American homeland security. The analyses suggest that some environmental policies may have a deleterious effect on the ability of the United States to achieve a level of energy efficiency in the transportation sector that could contribute to achieving “national energy security.” This study suggests ways to achieve a level of *sustainable energy security* by reducing consumption in the most important petroleum consuming sector, that of automobile transportation. Some U.S. oil dollars may be directly supporting terrorist organizations or, at a minimum, go toward supporting the spread of *radical Islamic Salafism* that is inimical to U.S. and Western interests. This inquiry examines evidence to show that America’s continuing dependence on other foreign oil, especially oil from the Middle East, is perilous to homeland security and compels limits to U.S. freedom of action in foreign affairs.

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LIST OF ACRONYMS AND ABBREVIATIONS

CAFÉ	Corporate Average Fuel Economy
CARB	California Air Resources Board
CHDS	Center for Homeland Defense and Security
CNG	Compressed Natural Gas
DOE	Department of Energy
DOT	Department of Transportation
EISA	Energy Independence and Security Act
EPA	Environmental Protection Agency
EU	European Union
FCC	Fluid Catalytic Cracking
FTA	Federal Transit Administration
GDP	Gross Domestic Product
HLS	Homeland Security
HSPD	Homeland Security Presidential Directive
LNG	Liquefied Natural Gas
MPG	Miles per Gallon
MY	Model Years
NHTSA	National Highway Transportation Safety Administration
NIMBY	Not in My Back Yard
NOI	Notice of Intent
NPS	Naval Postgraduate School
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
ONE	Operation Noble Eagle
OPEC	Organization of the Petroleum Exporting Countries
PNGV	Partnership for a New Generation of Vehicles
PU	Power Unit
R&D	Research and Development
RFP	Request for Proposal
SUV	Sport Utility Vehicle

U.S.	United States
USCAR	U.S. Council for Automotive Research
VMT	Vehicle Miles Traveled

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To my classmates, I want to thank you all for joining in this challenging intellectual journey and for all your contributions to our shared engagement with the emerging viewpoints of HLS as the field develops. You are all truly an inspiration and you give me great hope that we will ultimately prevail in this great struggle of ideas. It is your sense of right and wrong, your commitment to uphold the highest principled

character and values of our nation and your steadfastness in public service that leads me to believe that our efforts in homeland security are on the right path; one that will not only defend our nation and our people, but continue to safeguard our principles of justice and liberty.

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Lastly, I want to acknowledge the often-underestimated courage and promise of the American people who fund this educational program through their hard-earned tax dollars. I believe the American people can rise to meet any threat or challenge and the post 9/11 homeland security issues that have been center stage for more than a decade are just one more obstacle that will undoubtedly be overcome by a principled people who are fundamentally good and decent at the core of this society; that is the enduring strength of America and it is what will triumph.

PROLOGUE: A FAILURE OF IMAGINATION: FAILURE TO CONNECT THE DOTS

The 9/11 Commission found that . . . failure to “connect the dots” and imagine what was being planned was an important contributing factor to the September 11 attacks, stating “the most important failure [concerning the 9/11 attacks] was one of imagination” (Hamilton, 2004). This thesis is an effort to build upon the criticism of the 9/11 Commission in their findings on America’s failure to predict and prevent the terrorists attacks of that distant September morning. This inquiry attempts to use the same epistemological construction to examine if national leadership and the public at large, in the United States, are now similarly blind to the notion that dependence on Middle Eastern and other foreign oil may represent an unparalleled clear and present danger to the nation. This study tries to peel back the layers of the onion, to deconstruct the problem, and then with humility, offer a possible path forward designed to reduce the threat to the homeland and increase the resiliency of the nation.

Beyond the recognition of this dependence as a menace to homeland security, this study also examines some of the possible causes of the United States continuing its four-decade long saga of decrying this dependency while at the same time utterly failing to take decisive steps to remedy the condition. As with the events leading up to the tragedy of 9/11, the United States needs to “connect the dots” but this time, at a higher level of analysis, at the geostrategic level of scrutiny, to begin to understand how dependency on gulf oil is a transcendent strategic paradigm that represents one of the underpinnings of the global threat to the nation and how it is manifest in myriad areas of the life of the country. It is also essential to understand the impact it has on constraining foreign policy and the associated freedom of action to pursue the best interests of the United States. Moreover, finely, to coalesce these ideas into a well-reasoned hypothesis, it is necessary to “connect the dots” on the relationship between environmental policy and homeland security goals.

Clearly, numerous reasons exist as to why the United States has failed to attain energy security but this thesis is an attempt to focus on the single issue of the relationship between environmental policy and energy dependency through excessive consumption and the ultimate implications of that relationship on homeland security. In prologue, this effort is about identifying dots that need to be connected to illuminate the problem—and then crafting a balanced approach between environmental policy and homeland security goals to make a contribution toward national energy security. Herein, an attempt is made to use “imagination” to connect the dots and offer some hope for a more secure future.

I. INTRODUCTION

Matthew Harrison Brady: *I do not think about things I do not think about.*

Henry Drummond: *Do you think about things you do think about?*

—*Inherit the Wind*

Act II, Scene II

A Play by Jerome Lawrence & Robert E. Lee

1955

A considerable consensus in the United States concerning continued, even expanding, dependence on oil from the Middle East and other parts of the world poses a series of substantial problems and risks for homeland security, national defense, and for the nation's basic economic well-being. America's future becomes more precarious and the nation's ability to control its destiny is diminished with each additional barrel of oil imported from the Persian Gulf, hereafter known as the Gulf. Every U.S. president over the past 40 years, from Richard Nixon to Barack Obama, has forcefully and repeatedly stated that being dependent on the unstable Middle East for the nation's economic and strategic lifeblood is one of the highest priority challenges that must be addressed and rectified. The largest sector of the economy that consumes this imported oil is the light vehicle surface transportation sector consisting of the nation's nearly 260 million passenger cars and light trucks (Wikipedia, 2011b). There are approximately 660 vehicles for every 1,000 people in the United States and that number is growing (LeBeau, 2012).

On the production side, America has vast stores of hydrocarbon energy resources that have not been fully developed and some are not even open to development because of environmental regulations. However, to limit the scope of this inquiry to a reasonable breadth, this thesis shall only address the single issue of how environmental policy may influence the lack of efficiency in the consumption of motor fuels and its impact on homeland security. This study

could go into depth about a myriad issues regarding constrained domestic production of energy; however, that much broader discussion is beyond the scope of this effort and shall be for another day.

In way of overview, some relevant issues are identified.

- Automobiles and light trucks constitute the largest consumer sector for oil-based fuel.
- Technology is available today, and has been available for several years that would significantly decrease auto and light truck fuel consumption for the same miles driven.
- Environmental policy and regulations have prevented some of the most promising technologies to increase vehicle fuel mileage.

With the forgoing key points in mind, the purpose of this inquiry is to explore some of the possible reasons why the United States has not employed the optimum technologies to decrease fuel consumption and how that has affected homeland security. Another very simple and concise way of looking at this problem is that continued and even growing dependence on oil from the Gulf is clearly detrimental to the United States. The technology to decrease that dependence significantly is available today, as is the infrastructure to support that technological solution. So, why is America not using those means currently available to break this dangerous energy dependence?

This thesis uses a policy options method to examine a range of issues that may shed light on the basic questions above. America's dependence on oil from the Middle East may be the single most important issue concerning American homeland security (Brannan, 2009a). America's homeland security may be imperiled and the U.S. economy is appreciably weakened by the nation's policy choices in the realms of the environment, energy, and homeland security. This thesis explores the interconnectedness of policy choices in these spheres and attempts to illuminate the issue in ways that may have not been heretofore considered.

America's ever growing dependence on perilous and unstable sources of foreign oil, especially from the Gulf region, provides millions of dollars per year

that may end up in the hands of terrorist organizations, or persons and institutions that support terrorism to one degree or another. This dependence also precipitates the need for an excessively large and obtrusive footprint of Westerners in the Middle East, which is one of the reasons for radical Islamic enmity toward the United States (Strozier & Terman, 2010). The central point of this thesis is to examine the possibility that environmental policy may be in conflict with homeland security goals by unintentionally undermining the ability of the United States to move toward achieving energy security based on design and production of hyper efficient automobiles. This study explores the notion that this basic policy conflict is central to enhancing homeland security and reducing the threat of attack on this nation from Islamic fundamentalists. Herein, it is suggested that moderate and reasonable reform and modification in the environmental policy domain can contribute to greater security for the American homeland.

These vital issues of precarious oil dependency are at the heart of the homeland security and economic challenges facing the United States. Fortunately however, a potential solution to at least a portion of the challenge may be discernible through a logical deconstruction of the problem and the crafting of a policy option that may provide a path forward toward greater homeland security through elimination of the U.S. need for gulf oil. It is important to keep in mind that this thesis does not suggest that the entire energy dependence problem, nor will the nation's economic challenges, be remedied by reform of environmental policy and regulation as they relate to energy dependence. However, it does imply that some degree of modification to environmental policy can make a major contribution to achieving progress in these critical areas of national concern.

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II. BACKGROUND

A. FRAMING THE ISSUE—A TIME FOR REFLECTION

I have no problem with a war for oil—if we accompany it with a real program for energy conservation. But when we tell the world we couldn't care less about climate change, that we feel entitled to drive whatever big cars we feel like, that we feel entitled to consume however much oil we like, the message we send is that a war for oil in the gulf is not a war to protect the world's right to economic survival—but our right to indulge. Now that will be seen as immoral.

—Thomas L. Friedman
“A War for Oil?”

New York Times, January 4, 2003

The seemingly intractable problem of oil dependence is manifest in two primary realms. First, America's homeland security is inseparably tied to energy security. If foreign sources of oil were to stop deliveries overnight, the nation's economy would grind to a halt and the U.S. ability to provide for homeland security, and indeed national security, would be seriously imperiled. Energy powers the American post-modern industrial state and foreign oil, including oil from the Gulf, and has for the past 40 years, been a major part of the energy equation. It was learned very well during the Arab Oil Embargo of 1973–4 that the United States could be hurt by the decisions of foreign governments regarding petroleum supplies to America. Many people vividly recall the long lines for gas, the odd vs. even license plate numbers for gas purchases, and the inability to take a vacation trip in the family automobile. Is it unlikely that a major war between Israel and its Arab neighbors requiring America to provide a supply line to Tel Aviv could precipitate another oil embargo? How well insulated is America from another round of petroleum centered geopolitics and retribution?

While imports of petroleum have declined in the past five years, what would the situation have been without “The Great Recession?” The worst economic downturn in the nation since the 1930s certainly reduced the demand for oil in a substantial way. Figure 1 depicts oil consumption in the United States from 1973 through 2011.

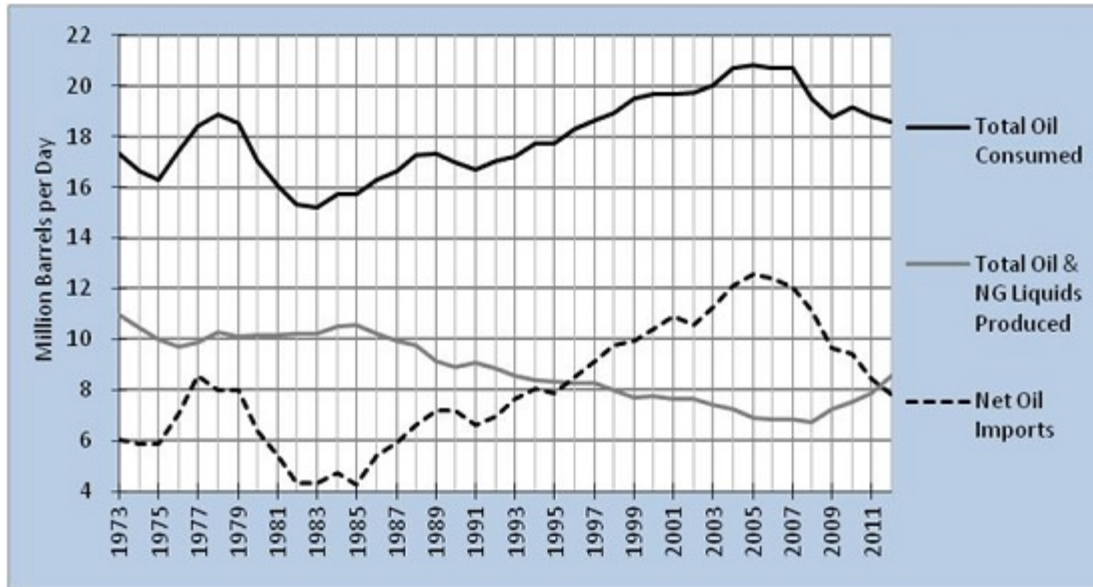


Figure 1. U. S. Oil Consumption (From Miller, 2012)

It is unquestionable that at least some of the money being paid, or that has been paid, for foreign oil ends up in the hands of people working diligently and creatively to harm the United States. While this issue has received a good deal of attention in the press and elsewhere, the public does not have definitive unclassified data to indicate the scope of this problem. However, even with a conservative estimate, of the 700 billion dollars that the United States spent on foreign energy in calendar year 2008, literature suggests that literally millions of dollars will end up either directly or indirectly supporting terrorism in some form or another. In addition, this money does not have to go directly to the terrorists themselves to harm America. Petro dollars have funded radical Madrassas in Pakistan and elsewhere (Weiss, 2007). How many terrorists of the future are

being indoctrinated to hate America in these radical fundamentalist institutions? America is paying to train young minds to think of the United States as the enemy and to consider Jihad against the *Great Satan* as the highest calling of a true believer. It is perplexing that the United States would allow this intolerable condition to continue. This thesis explores several ideas in an attempt to shed light on this issue.

This paradox of American economic and security vulnerability, and petroleum funded support for terrorism, makes finally achieving U.S. energy security an issue that deserves to be at the top of the policy agenda for the administration and Congress. Many scholars and political leaders have stated that achieving energy security is the single most important issue facing the nation as it enters the second decade of the new millennium (Brannan, 2008b).

As this report is limited in scope to automotive fuel efficiency and its impact on U.S. energy security, it would be good to take a moment to consider some of the more relevant data on this topic. In the period from 1978 to 2007, the average mileage figures for new cars sold in the United States rose from 20 miles per gallon (MPG) to about 26 MPG. However, most of that increase in mileage occurred between 1978 and 1982. In the 1980s and 1990s, while some minor improvements in vehicle fuel mileage were achieved, the size and weight of vehicles, largely due to the growing popularity of the ubiquitous Sport Utility Vehicles (SUVs), essentially kept the overall fuel mileage at a steady state of about 24 MPG to 26 MPG (NHTSA, 2008). At the same time, the average fuel economy for all vehicles on the road, which includes the new vehicles sold and the older models still in use, also saw a very similar if not impressive marginal gain in average fuel economy from about 14 MPG in 1978 to about 21 MPG in 2007. What is disconcerting is the data that shows the fuel economy line has remained essentially flat for the past nearly two decades (NHTSA, 2008). Again, this situation is attributed to the trend toward ever larger and heavier vehicles including the up-to-three-ton SUVs—such as the popular Chevy Suburban and Ford Excursion—during that time period.

At the same time that average fuel mileage of the “on the road light vehicle fleet” in the United States remained essentially flat, the total number of vehicle miles driven during the 1975 to 2007 time period more than doubled from 1.25 trillion Vehicle Miles Traveled (VMT) to 2.75 trillion VMT (NHTSA, 2008). It is clear that with a rapidly growing number of cars on the road, and the total VMT growing at a steady pace, average fuel consumption numbers can only be decreased by achieving a sizeable increase in fuel economy. Paradoxically, cars and light trucks need to achieve much better fuel economy numbers just to stay even in petroleum imports. Fuel mileage will need to double and double again to make an impact on overall oil consumption.

Other factors exacerbate the problem for the United States. Figure 2 shows the average motor fuel use per capital in five major industrial nations. With the major European nations and Japan at approximately 195 to 224 gallons per person per year, and the United States at three times that amount at 620 gallons per year, it can be seen that achieving significant fuel economy will be a real challenge. The way of life in the United States, and the nation’s geography and population density, present a unique set of challenges for policy makers as they attempt to address energy security. What are the issues that contribute to this large disparity in fuel consumption per person in the nations of the industrialized world?

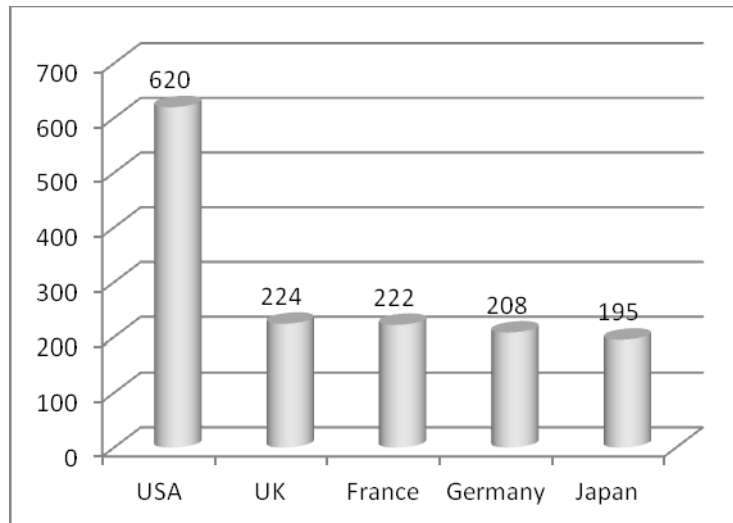


Figure 2. Gallons of Motor Fuel Used Per Capita by Nation

The United States is a large country geographically compared to the four G8 nations in Figure 2. American towns and cities and suburban areas are much more spread out over the broad U.S. landscape compared to the other nations listed. In this respect, U.S. topography is more similar to that of Canada, Australia, and Argentina than it is to Old Europe and the Far East. Many individuals and families in the United States have more than one car (“Study Finds Americans Own 2.28 Vehicles Per Household,” n.d.). One very small car can be fairly standard in Europe or Japan (Wikipedia, 2013).

Ridership on public transit in the United States, while growing, has not come close to the average use referred to as “mode split” in the other older and more densely populated nations of the G8 (Canada and Russia excepted). While the greater distances travelled in the United States and the number of cars owned per person do account for some of the differences in average fuel consumption, they are not large enough to account for the nearly three-fold higher consumption of Americans. Nor do the regulatory policies of the Europeans and Japanese account for their higher fuel economy as these regulations have only been in effect for a few years. Scholars assert, and it certainly comports to common sense that the single biggest incentive for achieving high fuel economy is the price of fuel (Nivola, 2009, p. 9). Even when

gas prices in the United States topped \$4.00 in 2008, the Europeans and the Japanese were paying more than twice that amount and they still are. Again, in 2012, as U.S. gasoline prices hovered near \$4.00, the Europeans and Japanese continued to pay much more for motor fuel with the United States averaging \$4.19 and Norway averaging \$9.69 per gallon. At the same time, the price per gallon in Saudi Arabia was 61 cents and Venezuela's astonishing price was 9 cents per gallon (Ritholtz, 2012).

It can be seen from Figure 3 that the overall cost to the consumer appears to be the single biggest factor in driving fuel consumption patterns in various countries. In the United States, it is simply still quite inexpensive to consume vast amounts of motor fuels. American fuel prices are a real outlier when compared to the rest of the industrialized world. Fuel can cost up to three times more for Norwegians and the Dutch to consume; therefore, it can be reasonably assumed that their lifestyle choices, and in particular, their driving patterns and purchase choices for autos are influenced by these costs.

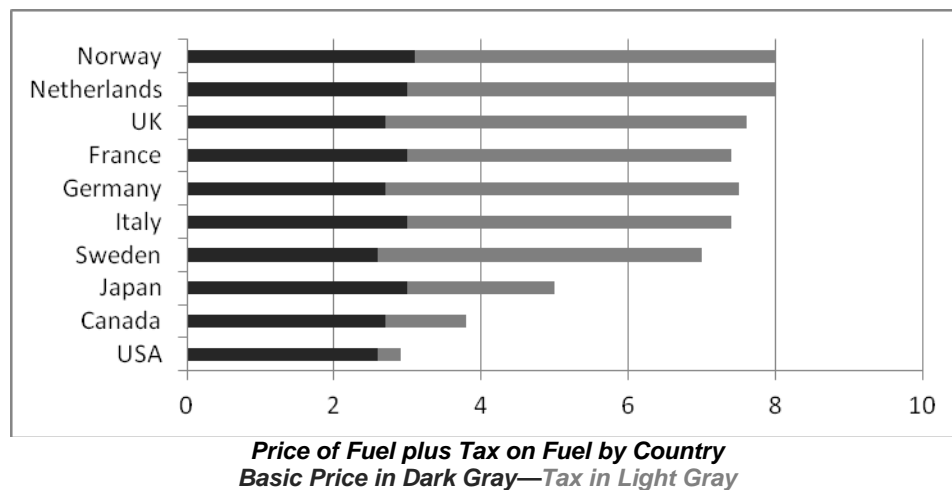


Figure 3. Prices of Fuel Plus Tax on Fuel by Country

In addition to the basic fuel cost and fuel taxing system imposed by the other industrialized nations, they also appear to have recognized that their national security is greatly affected by energy security. Fuel tax policy in these

nations clearly reflects the importance placed on minimizing fuel consumption as a matter of national interest. Throughout the European Union (EU), seriously minded energy efficiency action plans have been instituted to insure their energy futures are moving in the right direction as a matter of policy. This thesis addresses these several energy efficiency action plans later.

Pietro S. Nivola, of Brookings, in his 2009 manuscript on *Automotive Fuel Economy and American Politics*, suggest that a clear inverse relationship exists between vehicle miles traveled and the total price of fuel (Nivola, 2009). This fuel price elasticity has a pronounced influence on the types of cars people choose to buy and drive. This line of thought is further developed in the recommendations section of this thesis.

B. A WIDE RANGE OF ISSUES IMPACTING AMERICAN ENERGY SECURITY

A wide range of issues and policies impacts the ability of the United States to achieve energy security in the broad sense. Some of these issues include the choice of business models implemented by energy corporations and the ever-present Not in My Back Yard (NIMBY) syndrome that can arise in communities considering energy projects. The business models adopted by the auto companies also undoubtedly have an impact on fuel economy. Moreover, possible tacit, if not outright, collusion between the energy companies and the auto sector could contribute to maintaining the status quo (“How to Break to OPEC Cartel,” 2008).

The Mono-Energy Platform of the U.S. Transportation Industry

The USA has a transportation industry that has a “mono-energy platform” that is all cars, buses, trucks, and even rail run on oil.

This is the direct result of collusion between the American Auto Giants and American Oil companies from decades past. Electric trams or light rail was specifically targeted and retired through the use of government to do their bidding. (“How to Break to OPEC Cartel,” 2008)

Automobile companies may consider that diesel engines for instance actually “last too long” and that could appreciably increase the number of years that consumers keep their cars and avoid new car purchases (What Four-Year Itch?,” 2011).

How Long do Americans Keep their Cars?

According to R. L. Polk, a leading automotive market research firm, Americans are keeping new cars for an average 63.9 months—up 4.5 months from the same period in 2009. And we’re keeping used cars for 46.1 months, up 3.7 months from 2009. That’s a combined average of 52.2 months of ownership. (“What Four-Year Itch?,” 2011)

Underdeveloped technology and lack of innovation can also curtail positive efforts in achieving energy security. However, this thesis is primarily focused on certain policies and regulations of the federal government, and for example, a state level environmental agency like the California Air Resources Board (CARB), regarding domestic energy development, and in the case of California, motor fuel emissions. While environmental policy only contributes a portion of the problem of the nation’s failure to achieve energy security, the United States does not have to place its future in a degree of jeopardy by the unintended consequences of some environmental policy at federal, state and local levels of government—policy that conflicts with homeland security goals. This study examines whether these regulations may have the “unintended consequence” of reducing the nation’s ability to achieve homeland security goals by inadvertently blocking attainment of energy security through policies and regulations that may run counter to reduced motor fuel consumption (Figure 4).

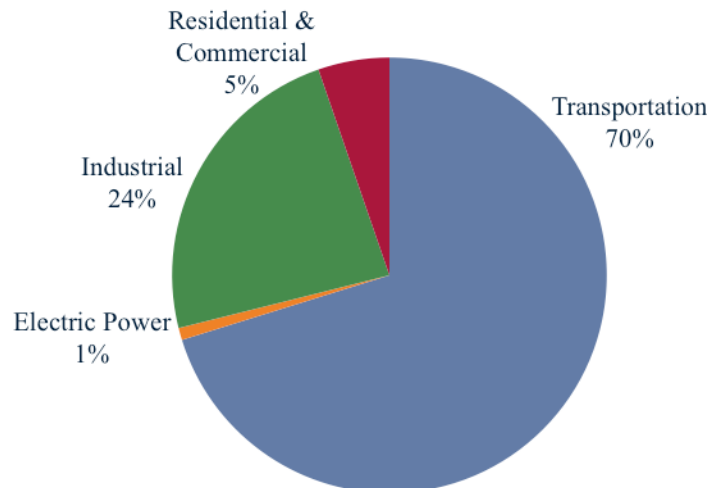


Figure 4. Oil Consumed in the United States by Sector
(From Oil Quick Facts, 2010)

Why is energy a national security issue?

Our entire economy depends on the expectation that energy will be plentiful, available, and affordable. Nations like Venezuela and Iran can use oil and gas as political and economic weapons by manipulating the marketplace. Half of our trade deficit goes toward buying oil from abroad, and some of that money ends up in the hands of terrorists.

—Gen. James Jones
General James Jones was appointed
National Security Advisor to the President on January 20, 2009
("Energy Independence," 2003–2011)

While in the midst of some recent oil import relief caused by the downturn in the U.S. economy, this long-term inability to achieve energy security means the continued, and even expanding, transfer of wealth on an unprecedented scale from the United States to the Organization of the Petroleum Exporting Countries (OPEC), and particularly, to the oil rich states of the Gulf. This stream of dollars from America to the Gulf transfers hundreds of billions of dollars per year (Graham, 2008) to areas of the world where some of the funds go to support international terrorist organizations. Since the numbers of dollars involved in this transfer of wealth may be so large, possibly in the hundreds of billions, (Bonner,

2008) even a small percentage of funds eventually ending up in the hands of extremists or terrorist could equal a vast sum of money each year (Fueling Terror, 2004a). While it is difficult to ascertain with certainty the level of oil money support for terrorism, the status quo is potentially a threat to American homeland security.

James Schlesinger on Energy and American Strategic Interest

The lack of sustained attention to energy issues is undercutting U.S. foreign policy and U.S. national security. Major energy suppliers—from Russia to Iran to Venezuela—have been increasingly able and willing to use their energy resources to pursue their strategic and political objectives. Major energy consumers—notably the United States, but other countries as well—are finding that their growing dependence on imported energy increases their strategic vulnerability and constrains their ability to pursue a broad range of foreign policy and national security objectives. Dependence also puts the United States into increasing competition with other importing countries, notably with today's rapidly growing emerging economies of China and India. At best, these trends will challenge U.S. foreign policy; at worst, they will seriously strain relations between the United States and these countries. (Schlesinger, 2006)

The foregoing does not suggest that the misaligned and uncoordinated state of public policy regarding the environment and homeland security are the sole source of the failure as a nation to achieve energy security. Many dimensions to this problem exist, but most are beyond the scope of this inquiry. Among the other factors impacting U.S. failure to achieve energy security include energy corporations' business models, NIMBY considerations, international trade policy and trade restrictions, foreign competition in the commodities market, perceived inadequate short-term alternatives, technical challenges, inadequate entrepreneurial spirit or capacity, and a lack of political will and focus. Nevertheless, herein, the focus is how environmental policy may impact vehicle fuel consumption in the United States and its impact on homeland security.

Do national leaders understand—do they connect the dots—regarding the impact of environmental policy on homeland security goals. Is America like the

fictional *Matthew Harrison Brady: I Do Not Think About Things I Do Not Think About*.

Note: Lawrence and Lee's character, Matthew Harrison Brady, is based on William Jennings Bryan the former member of Congress from Nebraska, President Wilson's Secretary of State and three-time Democratic presidential candidate—1896, 1900 and 1908. *Inherit the Wind* is based on the 1925 Scopes Monkey Trial and the unlawful teaching of Darwin's evolutionary theory in Tennessee.

C. TAXATION AND ENERGY

A host of historical and political reasons exists as to why the Europeans have been able to establish a tax system high enough to achieve an incentive level among consumers to choose the most highly efficient autos. Again, the cost of operations of cars and light trucks makes the biggest impact on a population's consumption of motor fuel. People are rational creatures and they will normally make intelligent decisions as to their selection of vehicle type, fuel mileage, and on how much discretionary traveling they want to undertake. These decisions are based on the total price (base price plus taxes) of fuel as a simplified way of looking at the issue. Of course, it can be assumed that several other factors also play into these purchase and consumption decisions including an individual's impact on the environment, concern with CO₂ emissions and global warming, wear and tear on the automobile, maintenance costs, and others. They also choose to purchase cars based on style and performance, past experience and other factors, but when the cost of operations is a significant portion of the family budget, these economic concerns weigh heavily on the purchase and travel decisions of people in the EU and other places in which fuel is significantly more expensive than in the United States. The combination of basic commodity cost and tax is generally sufficient in the EU to cause people to drive less and buy cars that get exceptionally good fuel mileage—at least to the view of Americans. The right to cheap gas has been the holy grail of American politics for decades and it is very hard to convince the American people, and a wide array of special

interests, that raising the fuel tax might be a good idea (Dodrill, 2011). In fact, openly calling for higher fuel taxes may be political suicide in America.

While the official party platforms of both the Democrats and Republicans call for “energy independence” and extol the virtues of energy efficiency, both parties seem unwilling to adopt the European model and tax motor fuels at a level that might cause a major shift in energy consumption based on price elasticity models. Herein lies the heart of the problem. This dichotomy is the central issue in the policy, or possibly better said, the lack of policy, and associated failure that has been a hallmark of U.S. energy policy concerning motor fuels for at least four decades. Republicans object on philosophical grounds and their sympathy with free market economics to almost any increase in taxes so they are opposed to increasing motor fuel taxes. Many Republicans and other conservatives believe that it is necessary to “starve the beast” (government) into submission lest it achieve dominion over all America (Bartlett, 2012). Democrats seem to feel that higher motor fuel taxes would tend to be regressive in nature and unfairly punish the poor, as the lower rungs of the socio-economic ladder would be paying a disproportionately higher tax burden for a commodity that displays little elasticity in demand (Harrison, 2002). If gas were free, most people would not use a significantly higher amount of fuel. On the other hand, if gas were very expensive, it would be expected that most people would still need or want to travel some minimum distance; therefore, they could be reasonably assumed to consider vehicles that achieve much better fuel economy. Interestingly, both camps may be correct or at least some merit may be seen in their assumptions and positions on this issue. Therefore, the prospects of Congress passing a substantially higher fuel tax is a non-starter, and has nearly only minimal chance of becoming the law of the land. The European solution to energy security of high taxes may not be available to policy makers in the United States owing to the nation’s traditions, culture, history, and system of government, which is a relatively weak central government, and divided government, compared to many of the parliamentary systems in the EU.

The EU system of government and the way its mostly parliamentary strong unified central governments impose taxes has led to a system that Americans would possibly consider outrageously high taxes charged on each liter of petrol or diesel. In the United States, rational attempts to raise fuel taxes to a level that would have a moderating effect on VMT is resisted against due to the orthodoxy of the people's right to cheap gas. While painful, Americans did ration motor fuel in World War II, and if leadership from elected officials was forthcoming to inform the public about the importance of achieving energy security, it might be surprising as to how the population would react to some kind of surcharge on motor fuels labeled as a national defense or homeland security investment.

Since several attempts to raise the federal fuel tax over the past half century have been countered by a host of special interests from both the right and the left, it seems tax/price options for fuel conservation are somewhat limited. Those policy makers who are highly motivated and concerned with the world's highest fuel consumption and the dangers of energy dependency are left with trying to modify consumption through other means.

The environmental lobby has been the main backer of the Environmental Protection Agency's (EPA) Corporate Average Fuel Economy (CAFÉ) standards as set forth in federal law and regulation. For decades through a wide range of loopholes and exemptions, lobbyists have won waivers from the regulatory agencies. The CAFÉ standards have contributed little to the goal of achieving energy security through a hyper efficient national vehicle fleet. Over the past two years, the Obama Administration and Congress have passed significantly more stringent CAFÉ standards but they will not go into full effect until 2025, and even then, they are not high enough to make the kind of impact needed to get off Middle Eastern oil considering the projected rate of growth in VMT. The obvious and biggest problem with the CAFÉ standards is they attempt to regulate the producer to build cars that people may not want to buy. It clearly did not work

when California required manufactures to sell a certain percentage of “zero emission” cars. No viable product existed and the regulatory attempt was a failure. While some modest progress has been made in average fuel economy, these regulations are less effective than those required to make a dramatic impact on energy security. It should be kept in mind that the CAFÉ standards were established with an eye toward environmental issues and with a lesser concern for the broad issue of national energy security and transfer of wealth to hostile hands. It should also be noted that even if the United States achieves marginally higher fuel mileage per vehicle, each year more vehicles are on the road to keep pace with a growing population. The deep recession of 2008 through 2013 has caused a down turn in fuel consumption but it is quite reasonable to assume that consumption will rise to and surpass previous levels once the economic recovery is in full effect. The CAFÉ standards are a way for policy makers to make some progress and to do something positive, yet they are largely ineffective as they do not address economic fundamentals and market realities nor are they of significant import to match the problem. Simply stated, CAFÉ is not up to the task. However, making an impact on these market forces may be achieved through other initiatives.

Figure 5 depicts the energy efficiency standards for selected nations in the 2002 to 2022 time period (Saundry, 2012).

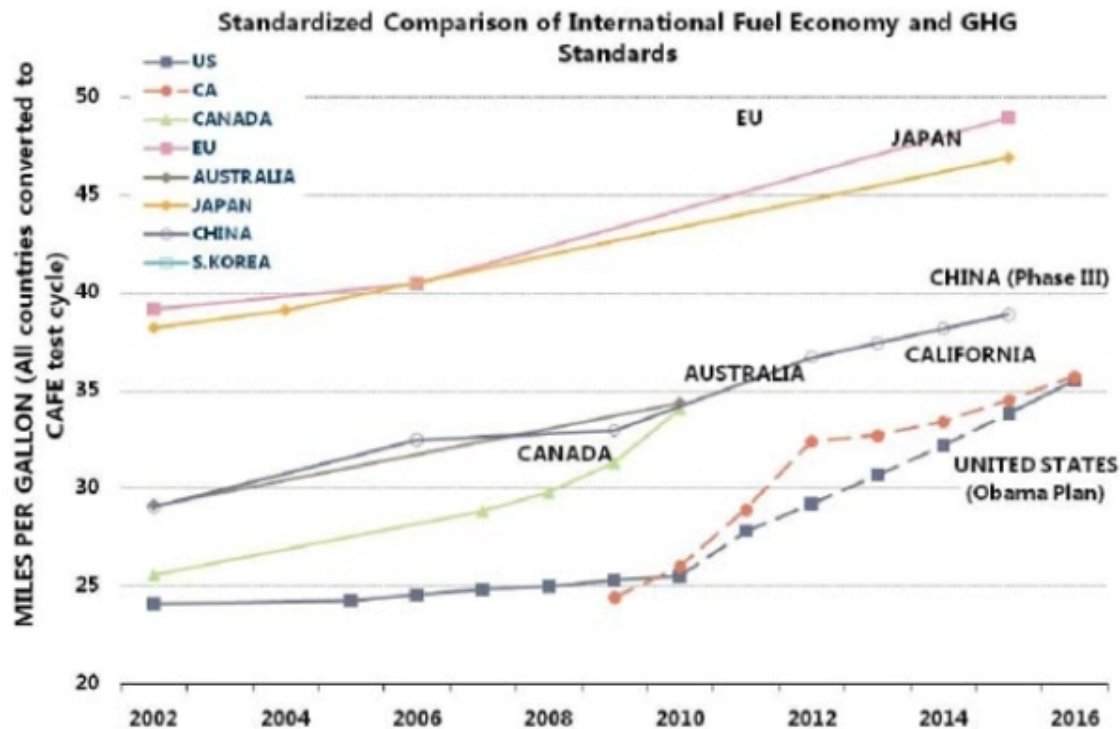


Figure 5. Miles per Gallon by Various Countries

D. WHAT IS AMERICAN ENERGY SECURITY?

First, we have to find a common vocabulary for energy security. This notion has a radically different meaning for different people. For Americans it is a geopolitical question. For the Europeans right now it is very much focused on the dependence on imported natural gas.

—Daniel Yergin
The Quest
 2011

For the purpose of this investigation, the term “American Energy Security” means that all petroleum energy consumed by the United States should come only from North America. While other stable areas of the world from which America could now obtain a steady supply of oil certainly exist, such as the North Sea, Brazil and others, what is suggested in this thesis is that it is in the geostrategic interest of the United States to rely only upon North American oil

supplies over the long term. The oil produced by the United States, Mexico, and Canada is physically close at hand, requires minimal vulnerable transport, is reasonably stable, and is controlled by the United States and longstanding friendly and stable neighbors and trading partners. All of North America is clearly within the United States' geopolitical sphere of influence and that of its neighbors to the north and south. The three largest nations of this continent will not allow outside influences to harm longstanding positive relationships. Many leading statesmen have warned that counting on oil from many other foreign suppliers is inherent risky and may be untenable over the long run ("Quotes from Energy Experts—Energy Research, Peak Oil, Terrorism and More," n.d.) James Akins, as the U.S. State Department's chief energy expert in the early 1970s (and a former Ambassador to Saudi Arabia) predicted, growing U.S. dependence on Middle East oil gravely threatened the national economy. He was vindicated when nearly all his predictions came true, starting with the 1973 Arab oil embargo (Shaprio, 2010, p. 1).

Figure 6 depicts the major sources of consumed energy in the United States as of 2005.

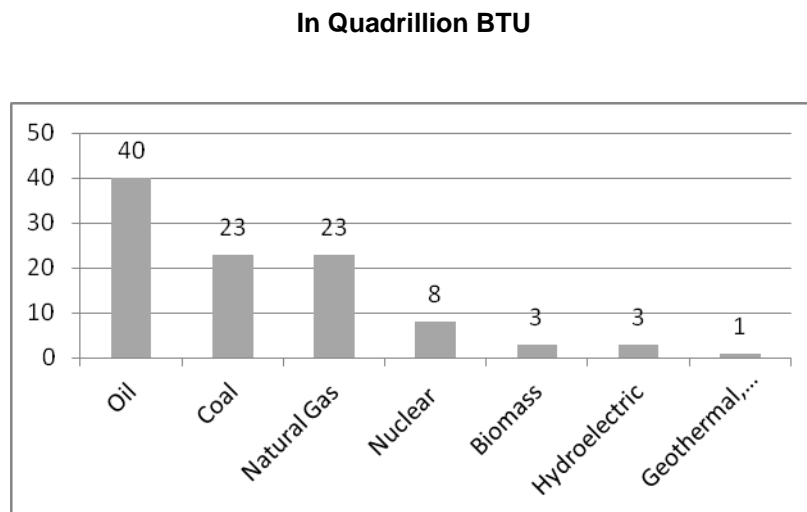


Figure 6. U.S. Primary Energy Consumption by Source, 2005

Oil still drives the U.S. economy and will for the foreseeable future. American oil dependence necessitates that, to ensure a continuing supply, the nation may be forced to protect foreign sources of vital energy, which is the life-blood of the economy. The first Gulf War was a perfect example of this enormous strategic vulnerability. In an unspoken admission of U.S. economic vulnerability and sheer dependence on Middle Eastern oil, a half million U.S. troops were sent to the Gulf in part to fight and die to guard against a possible cutoff of the crucial oil that propels the American economy. Policy makers did not state that line of reasoning and thought in public. It was not widely debated in the public square, yet this fundamental reality is apparent in that the United States has and continues to spend vast treasure and even the lives of its citizens to secure gulf oil.

While that (1990–91) war was over long ago, through taxes, the United States is continuing to pay for protecting oil supplies with the young men and women of the U.S. Armed Forces. The U.S. Navy is constantly on patrol in the key shipping lanes for the world's oil supply. The Navy's cost alone is substantial. Billions of American dollars have been spent to protect the oil, but much more importantly, lives were lost and are continuing to be lost as well. The failure of the United States to achieve real energy security has led to a continued heavy American footprint in the Middle East and in the Gulf region, which is a fundamental cause of deep-seated animosity toward America and the West (Clemons, 2010).

Reliance on Middle East oil is a growing danger. Fuel price shocks or shortages could become rampant if supply is disrupted. Up until very recently, the Middle East supplies about one-third of U.S. oil consumption. It can be safely assumed that the current downturn in imports is largely due to the recession and some moderate increase in domestic production, which may indeed be temporary. As recently as 2010, it was asserted that on the longer term trend line

.” . . by 2030, if America does not change its energy policy and energy consumption patterns, the nation may be relying on Middle East oil for two-thirds of the supply” (“The Hidden Cost of Fossil Fuels,” 2010, p. 1).

E. ROOT CAUSES OF THE JIHADIST THREAT TO THE WEST: THE HEAVY FOOTPRINT OF THE INFIDEL IN A LAND THAT REJECTS MODERNITY

Those who embrace a violent form of radical Jihadism against the West may represent only a small percentage of the Muslim population but their influence is large beyond their numbers (“Internationalizing the Jihadist Threat from Pakistan-Afghanistan,” 2010). Prior to the recent visit to his Pakistani villa near the Pakistani Military Academy in Abbattabad by U.S. Navy Seals, Osama bin Laden should have been taken at his word when he said he would run the Americans out of the Land of the Two Holy Places. Bin Laden was clear and unequivocal in his 1996 *fatwa*, or declaration of war against America (Bin Laden’s Fatwa, 1996).

The Fatwa

The PBS News Hour published the full text of a fatwa, or declaration of war, by Osama bin Laden first published in Al Quds Al Arabi, a London-based newspaper, in August, 1996. The fatwa is entitled “Declaration of War against the Americans Occupying the Land of the Two Holy Places.” (Bin Laden’s Fatwa, 1996)

Bin Laden had railed against the United States for interference in Saudi Arabia and the Gulf region. He was (ostensibly) particularly concerned with the way that American foreign policy has at times supported repressive autocratic regimes in the region—at least the autocracies that did not subscribe to his world view or treat him with requisite deference.

While it can be debated at length, the root causes of the Jihadist threat to the West vary in form and intensity. Different readings and understandings of the Holy Scripture in the *Qur’an* that calls for the subjugation of non-believers is certainly one possible cause. This version of Salafi Jihadism is one such reading and its adherents are called to jihad as a matter of obedience to their faith. It is a

renewal of the faith, true to the original meaning of scripture in the eyes of the Salafist (Kramer, 2002). Another fundamental cause of the Jihadist threat is what is seen by many Muslims as a large, unwelcome and even dominating footprint of the infidel—or the *Crusaders* as they are called by radicals—in their Holy Land. Some fundamentalist also reject the western modernity they bring with them. Radical Jihadists cite traditional culture and values as the primary concern why western non-believers offend them (Livesey, 2005, p. 1). This sheer presence of foreign, non-Muslim non-believers, with their decadent Western ways and lack of morals desecrating the Land of the Prophet, infuriates many radical fundamentalist Muslims (Suttle, 2009, p. 1).

The West, because of oil, has often maintained a large, and possibly imperious presence, in the region since the decline of the Ottoman Empire nearly a century ago at the end of World War I. The westerners, including Americans, were often seen as obnoxious, ill mannered, and without honor—in general, foreigners offensive to the sensibilities of pious Muslims. For a hundred years, the West has not been willing to allow non-western hegemony over this critical strategic resource upon which the economy of the western world precariously depends. The intensity of radical Islam's objection to a western presence in the region came to a crescendo during the first Gulf War (1990–91) when the leadership of Al-Qaeda was incensed by the stationing of a western military in Saudi Arabia, which is the holiest soil in the Muslim world (Upadhyay, 2010, p. 1). American boots on the ground in the holiest nation of the Muslim world was the ultimate insult, which set the stage for violent confrontation and the subsequent threat to homeland security in the United States. Again, all because the United States is dependent on foreign oil and the single largest source of this vital strategic resource is Saudi Arabia. This dependence on foreign oil resulted from the United States not fully developing the wide range of domestic options nor has it attained the hyper fuel efficiency, especially in the automobile fleet, that is technologically feasible today and has been for the past decade and a half (Wikipedia, 2011f). This hyper fuel efficiency in the U.S. auto and light truck fleet

is also attainable, and has been, without requiring major investment in fueling infrastructure, which will be a key to the solutions proffered and recommendations provided in this thesis.

F. DECONSTRUCTING THE PROBLEM

- The United States maintains a large presence in the Middle East because it perceives that presence to be in its geostrategic interests to secure access to oil (“Energy Independence,” 2003–2011).



- The United States needs oil from the Middle East because it usually consumes an amount disproportionate to its population while failing to develop domestic resources fully (Zubrin, 2007).



- The surface transportation fleet, especially automobiles, is the largest sector using oil in the United States (“Energy Independence,” 2003–2011).



- A major factor contributing to the U.S. consumption of an excessive amount of oil is the lack of development of maximum automobile fuel efficiency with currently available technology and supportable nationwide by the more than \$200 billion invested in petroleum fueling infrastructure (“Review of the Research Report of the Partnership for a New Generation of Vehicles: Seventh Report,” 2001).



- One of the reasons the United States has not achieved auto fuel efficiency is because overly strict and inflexible environmental regulations, at the federal and state levels, have blocked or severely discouraged some of the most promising technologies—including very efficient diesel engines—to achieve hyper fuel efficiency (“Update 2: Cummins, Feds Developing Four-Cylinder Diesel for Nissan Titan,” 2011).



- The auto industry has historically resisted CAFÉ standards and these standards may not be adequately synchronized with market forces.



- Policies that may inadvertently block the best technologies for auto fuel efficiency reduces momentum and commitment within the auto industry for achieving hyper fuel efficiency.



- U.S. failure to achieve energy security is one of the primary factors causing the threat to America's homeland.



- America has developed full size family sedans that achieved between 72 MPG and 80 MPG more than a decade ago ("Partnership for a New Generation of Vehicles," 2010).



- Failure to develop and deploy hyper-efficient autos foregoes enormous domestic economic activity and tax revenues that could go toward reducing the deficit (among other uses).



- Failure to achieve hyper-mileage in the U.S. auto fleet is a policy choice.



- America's long-term dependence on Middle Eastern oil is an unintentional policy choice.



- The continued flow of American financial support for the Islamic Jihadists, with the dollars Americans spend on Middle Eastern oil, is an unintentional policy choice.



- The continuing heightened state of terrorism risk to the United States and the continuing deployment of U.S. troops to the Middle East region is a public policy choice due in part to policy in conflict.

To reiterate, “Policy in Conflict” suggests that certain environmental policies, and associated implementing regulations, negatively impact homeland security by reducing the ability of the United States to eliminate or significantly reduce oil imports from outside of North America. While the consequences of these environmental policies are not alone in contributing to this reliance on Middle Eastern oil, they do have an impact, which if avoided, could lead to a dramatically reduced American footprint in the Middle East. This thesis includes an examination of a range of issues intertwined with these concepts. Finally, the document offers possible policy recommendations that may hold promise for reversing the dangerous trends of the past five decades. Above all, this analysis is intended to be a serious examination of how policy in different domains may be unintentionally counterproductive to the national interest in other domains. It suggests that a broader understanding of the interrelatedness of these policy spheres is necessary to craft sound, mutually supportive policies and programs to serve the broader public interest, and especially, the vital interest of homeland security. Policy makers in the realms of energy, the environment, national security and homeland security need a deeper understanding of the interdependence of these matters to achieve coordinated, symbiotic, and mutually supportive public policy. Policy goals in one area should not be counterproductive to the objectives of another. Consideration of a range of possible consequences of policy should be analyzed in a manner that sheds light

on the possible interaction effects. As in pharmacology, the medication for one ailment should not exacerbate another. Likewise, protecting the environment should not do harm to U.S. energy and homeland security.

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III. RESEARCH QUESTIONS

- Does environmental policy conflict with homeland security goals?
 - Do certain environmental policies at the federal, state or local levels of government unintentionally hinder or restrict the ability of the United States to achieve energy security?
 - In what ways and in what degree could this conflict of policy be detrimental to the nation's homeland security?
- If environmental policy does conflict with homeland security goals, what kind of a national strategy should be engaged to facilitate the thorough and effective consideration of homeland security goals and objectives with respect to energy security when developing environmental policy?

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IV. LITERATURE REVIEW

We can't conserve our way to energy independence, nor can we produce our way to having enough energy available. So we've got to do both.

—George W. Bush, 43rd President of the United States, quoted in
“Bush Launches Effort to Sell Energy Policy Overhaul”
The Washington Post, May 2001

The literature review for this thesis mainly resides in five domains: (1) the technology for fuel efficiency, (2) transfer of wealth and financial support for terrorism, (3) causes and impacts of an overly large of obtrusive U.S. presences in the Muslim World, (4) the conflict between environmental and energy policy, and (5) the interrelatedness of environmental policy and homeland security. In the first three domains, a wealth of current and insightful literature exists to inform this research. In the fourth and fifth domains, the policy sphere, solid literature is lacking to nearly non-existent.

This literature review has revealed a wealth of information in most of the subject areas of this thesis and very little to almost none in the policy area. This review describes the findings of the literature search and provides comments on the quality and quantity of literature available to inform this study. The thesis examines the broad and rich and very much in-depth literature on fuel efficiency in the automobile transportation sector. Numerous articles, reports, scientific papers, websites and books are available concerning the several initiatives to develop hyper-efficient automobiles. Consideration of the best sources of literature on the technology issues may be in the several reports from the National Academy of Science in their annual reviews during the seven-year Partnership for a New Generation of Vehicle (PNGV) program during the Clinton Administration (“Review of the Research Report of the Partnership for a New Generation of Vehciles: Seventh Report,” 2001). This stream of literature from the National Academy is quite technical in nature and much of it is at a more

technical level than this thesis is intended to examine. However, the reports do show that workable technology is available now and has been available for the past 15 years that could possibly contribute to solving the near term oil dependency problem if that technology was not impaired by the overreach of environmental policy as one area of improvement. The Clinton Administration established the PNGV early in the 1990s to show the technical feasibility of developing “hyper-mileage” vehicles with proven technology at reasonable costs using currently available technology (“Partnership for a New Generation of Vehicles,” 2010). The literature also indicates and it is important to note that certain technological advances can be supported by current auto fueling infrastructure, which might render other alternatives unworkable. Indeed, while multiple technologies could reduce imports of Middle Eastern oil for the automobile transportation sector, these technological options, such as Compressed Natural Gas (CNG) and hydrogen, require hundreds of billions of dollars in infrastructure investment to support a radically new refining, bulk storage and distribution, and nationwide end-user fueling regime. The literature on the full range of technology is rich, broad, and deep. Numerous authors, scientists, think tanks, academic centers, and private industry organizations have written extensively on the several technologies available to address hyper-mileage cars to reduce auto emissions.

Another of the more important literature resources for this study is the work of Robert Zubrin in his widely acclaimed work *Energy Victory*, which addresses energy security through an “open full standard” for automobile fuels (Zubrin, 2007). The literature available in this area of the research will support the goals of this thesis work. This area of the inquiry shows that this hyper-mileage technology can be fully supported by current infrastructure, which has been one of the primary obstacles to some of the other alternative fuels programs. The literature clearly indicates that the ability to use current fueling infrastructure is key to the success of any automotive energy reduction strategy. The sunk cost of the U.S. auto fueling infrastructure investment is critical to any

future plans or policy regarding fuels and energy security. The research is also based on a brief examination of the literature on the causes and nature and dynamics of “the law of unintended consequences” for which again a sound body of literature exists to illuminate the work of the famed sociologist Robert Merton in his seminal 1936 treatise (Merton, 1936).

A large body of literature is also available regarding the concept of the impact of the intrusive footprint and unwelcome presence of the infidel in the land of the prophet (Said, 2004, pp. 2, 28). The poor self-image and feeling of victimization has been a burden for the Muslim world since their ejection from Europe with the fall of the Emirate of Granada in 1492 at the end of the Spanish-Portuguese *Reconquista*. A new world began in 1492 in more ways than the discovery of Columbus as the end of the Muslim Caliphate transpired. Substantial writing exists on the issue of the Muslims feeling as if they have been victimized, subjugated, and generally treated as second class people since the decline of the Caliphate of Cordoba in 1051 (756–1051). Charles B. Strozier and David M. Terman provide a good overview of the way many Muslim fundamentalists regard their current state of diminished dignity and cultural decline in their 2010 book *The Fundamentalist Mindset* (Strozier & Terman, 2010). The overall literature in this domain is quite compelling and rich, and it certainly provides adequate grounding for research in this area of the thesis.

Finally, this thesis examines the relevant literature in the area of environmental and energy policy to determine how well policy in these issue areas are coordinated and the extent to which they are either mutually supporting or in conflict. Leaders in the two policy domains do not routinely engage in any structured process to coordinate policies or ensure that their actions are not counterproductive to one another’s goals. Not much in the way of scholarly writings on this topical area is in existence. A few written articles deal with local issues, such as *Conflicting Environmental and Energy Policy: The Portsmouth Oil Refinery* (Choi, 1984), and the video of Sen. Lisa Murkowski’s comments on the Senate floor regarding the Obama Administration’s environmental and energy

policy (Murkowski, 2010). However, a good set of literature on the broader, macro level question central to this investigation may not exist. This lack of relevant policy literature represents the biggest gap in the literature; therefore, this thesis is intended to contribute to filling in this important knowledge gap. The state of knowledge and adequacy of literature to include the degree of scholarly discussion of the central issue and *corpus* of knowledge regarding the potential *Policy in Conflict: The Struggle between Environmental Policy and Homeland Security Goals* is an important undertaking to which this thesis is directed.

Lastly, this study attempts to synthesize the disparate literature and the other sources of information in an attempt to contribute to the field of homeland security by suggesting a path forward in both further research and suggested policy initiatives or reforms that might lead to enhanced U.S. energy security and significantly strengthened homeland security. This work is designed to enrich and advance the homeland security narrative by connecting dots heretofore not connected and by turning loose the imagination, even letting the Matthew Harrison Brady's of America " . . . Think about the things we think about."

V. ARGUMENT

Every act of energy conservation like this is more than just common sense—I tell you it is an act of patriotism.

—Jimmy Carter, 39th U.S. President
Speech to the Nation,

“Energy and the National Goals—A Crisis of Confidence,” July 1979

Among several issues that may impede U.S. energy security, certain environmental policies at various levels of government in the United States may have a negative impact on the nation's ability to achieve homeland security goals. In terms of increasing efficiency of the automotive fleet (demand side), certain environmental policies have the unintended consequence of restricting the ability to achieve U.S. energy security. These narrowly crafted environmental policies have, in effect, contributed to blocking the long-standing national goal of achieving an adequate level of energy security.

A. MAIN CLAIM

- Certain environmental policies conflict with homeland security goals by impeding the ability of the United States to achieve energy security.

Reasoning Behind Claim—Certain environmental policies and regulations restrict the use of the most efficient, currently available technology to reduce oil consumption. The most important example of this phenomenon is the CARB regulations on automobile diesel emissions. Diesel cars are about 30% more fuel-efficient than gasoline powered cars and Europe has about a 50% market penetration for diesel automobiles largely due to their superior fuel efficiency on a continent where fuel can cost up to \$8.00 per gallon. After being effectively prohibited in the United States for several years, these very efficient diesel cars account for only about 2% of the market (Omotoso, 2008).

B SUBCLAIMS

1. Sub-Claim 1

- Some environmental policies are too narrowly focused and are developed without adequate consideration of possible unintended consequences in the area of energy dependence.

Reasoning Behind Claim—Proven technology has been available for more than a decade that, if used on a massive scale and nationwide, could cut motor fuel consumption by three quarters. With motor fuel being by far the largest consumer sector for use of oil, applying this available hyper-efficient technology could go a long way toward reducing oil consumption to a point at which the United States would not require any oil from outside of North America. Certain environmental regulations have not allowed this most efficient technology, which is compatible with current infrastructure support, to be used.

2. Sub-Claim 2

- With the absence of coherent and fully coordinated environmental and energy policy, industry has failed to market hyper-mileage cars in the United States even though such cars were successfully developed and tested more than 15 years ago.

Reasoning Behind Claim—Among other causes of this dysfunction, because environmental and energy policy has not been coordinated and synthesized based on an internally consistent, fully coherent and mutually supportive set of principles, the auto industry has not brought to market hyper-efficient technologies that can be sustained by the current infrastructure (“Partnership for a New Generation of Vehicles,” 2010).

3. Sub-Claim 3

- The solution to this problem of policy in conflict lies in the federal government establishing a rational and effective set of policy principles to guide policy formation in the environmental and energy spheres. The government should also mandate national standards for auto emissions that provide for reasonable flexibility and trade-offs for hyper-mileage cars. Another part of the solution is in the federal government establishing strong and effective financial

incentives and disincentives that will encourage and stimulate bringing hyper-mileage cars to market in the massive numbers needed to achieve U.S. energy security within a reasonable time frame of about five to 10 years.

Reasoning Behind Claim—With different states establishing a range of uncoordinated standards for auto emissions, it reduces the auto industry's incentive to develop and bring to market the most effective and efficient technologies even though hyper-efficient power train technologies have been available for the past decade and a half ("Partnership for a New Generation of Vehicles," 2010). It is essential that national standards on auto emissions and on fuel consumption be established so the nationwide auto industry has just one set of rules. Without this national standard, it is excessively expensive to design, develop, and manufacture autos for different markets as the economic benefits of economy of scale are diminished. Some economic studies have suggested that a well-structured system of incentives and disincentives or "Feebates" might be able to speed the inevitable transition to hyper-efficient autos (Lowe, 2010, p. 1).

4. Sub-Claim 4

- Every day a U.S. service member dies or is seriously wounded in the Global War on Terror and the U.S. military engagement in the Gulf/Middle East. These brave young Americans are giving everything for their country. This thesis suggest that the rest of the U.S. population simply make a concerted and immediate effort to reduce oil consumption down to the point where it will no longer be necessary to put these young Americans in harm's way to secure American geostrategic interests.

Reasoning Behind Claim—It has been asserted by many knowledgeable people that the single most important thing the United States can do to enhance homeland security is to "get off foreign oil" (Brannan, 2009; Fueling Terror. 2004b). Every time an American gas tank is filled at the station, some of the money is being sent to parts of the world in which at least some of the revenue ends up in the hands of people who would do harm to American interests or much worse. In terms of international relations, American freedom of action is severely constrained by the untenable and perilous dependence on this vital

strategic resource. Ending reliance on Middle Eastern oil will allow the United States to reduce its footprint in the region down to a routine level that would not constitute an affront to fundamentalist Muslims, and thereby, reduce their animus toward America (Zunes, 2003, p. 64). It would also allow the United States to engage in foreign policy toward the region not seen as supporting authoritarian, sometimes brutal, regimes. America's stance and policy toward the region would be seen as much more benign, fair, and inoffensive to Muslim sensibilities; the Israeli issue notwithstanding.

VI. RESEARCH METHOD

This project utilizes the policy options analysis research method. Examination of a range of available policy choices is undertaken to determine their potential for delivering effective and desirable policy outcomes. Evaluation of their potential costs and effectiveness and the political feasibility is also engaged. Lastly, a predictive model to test possible outcomes against the assumptions and constraints of the model is suggested.

This policy options analysis utilizes the research method outlined in *Eightfold Path to More Effective Problem Solving* by Eugene Bardach (Bardach, 2005).

- Define the problem
- Assemble some evidence
- Construct alternative solutions
- Select criteria for judging success
- Project the outcomes from alternative solutions
- Analyze trade-offs between outcomes
- Choose the best solution
- Explain recommendation

A. POLICY CHOICES

This thesis investigates four policy choices or options as part of the policy options method of inquiry.

- Option One: Status quo.
- Option Two: Increase motor fuel consumption taxes to reduce consumption.
- Option Three: Increase CAFÉ targets to reduce consumption.
- Option Four: Craft policy containing incentives/disincentives that do not inhibit but rather encourage and support the achievement of hyper-efficient autos to reduce consumption.

A comparative study is conducted using a weighted matrix analysis to reveal how each of the four policy options would be expected to perform against specific evaluation criteria. This evaluation is conducted by synthesizing and integrating the relevant literature and how the options can be projected to perform in relation to each criterion.

B. WHY IS THIS PROBLEM IMPORTANT?

It is not an overstatement to assert that this problem, of American dependence on Middle Eastern oil, may be one of the single most important issues facing the homeland security enterprise. Unfortunately, when most people think about homeland security, they think in terms of immediate threats of violence directed against America or its allies. Yet, America's precarious dependence on Middle Eastern oil may be at the very center of the threat to homeland security as has been vigorously argued by several presidents and congressional leaders for decades (Obama, n.d.). Even though this problem of strategic energy dependence is an enormous vulnerability for America, and each year, America sends billions of dollars overseas and some of the money ends up in the hands of terrorist, the dots are not always connected that would reveal the relationship between excess oil consumption and the threat to homeland security. Thus, the theme of this thesis is that of encouraging the consideration of the full range of ramifications of the oil dependency issue and the multiple ways that it impacts homeland security. Another topic that makes this issue of vital importance is the longstanding involvement of the United States in the Gulf and Middle East region as it has tried to protect and secure western access to the vital strategic resource of oil that powers the western world. In light of the nation's recent supply and demand curves in oil, it is apparent that any severe cut-off or reduction in the oil supply would be devastating to the national economy and threaten national security. The reason this issue is important is reflected in the following list of major impacts of on America.

- Impact on homeland security
- Impact on strategic energy security

- Importance for national economy
- Impact on national security
- Impact on food production
- Impact on perceptions of the United States in the Muslim world
- Reduced animus toward the United States with a reduced foot print in the Middle East
- Creation of jobs in, and expanded markets for, American agriculture
- Creation of jobs in, and expanded markets for, worldwide agriculture, especially in the poor nations of the African, South American and Asia-Pacific tropical zones where biofuel stocks can be grown economically

C. WHY FUEL EFFICIENCY IN THE AUTOMOBILE TRANSPORTATION SECTOR WAS CHOSEN AS THE CENTRAL ISSUE FOR THIS STUDY

If we prepare for climate change by building a clean-power economy, but climate change turns out to be a hoax, what would be the result? Well, during a transition period, we would have higher energy prices. But gradually we would be driving battery-powered electric cars and powering more and more of our homes and factories with wind, solar, nuclear and second-generation biofuels. We would be much less dependent on oil dictators who have drawn a bull's-eye on our backs; our trade deficit would improve; the dollar would strengthen; and the air we breathe would be cleaner. In short, as a country, we would be stronger, more innovative and more energy independent.

—Thomas L. Friedman
 “Going Cheney on Climate”
New York Times, December 8, 2009

Figure 7 shows that the transportation sector consumed 67% of all petroleum products used in the United States in 2004. Light duty vehicles accounted for 61% of the 67% or a total of 41% of gross oil in 2004. By 2030, this percentage is projected to increase to 73% just for light duty vehicles as population expands and more cars are on the road (Hauenstein, 2008). These consumption numbers clearly show that light duty vehicles, cars, and light trucks, constitute the largest consumption mode for oil in the nation. As the largest single

consumption modality dealing with the challenge of auto and light truck, fuel efficiency can make a significant impact on overall oil consumption in the United States.

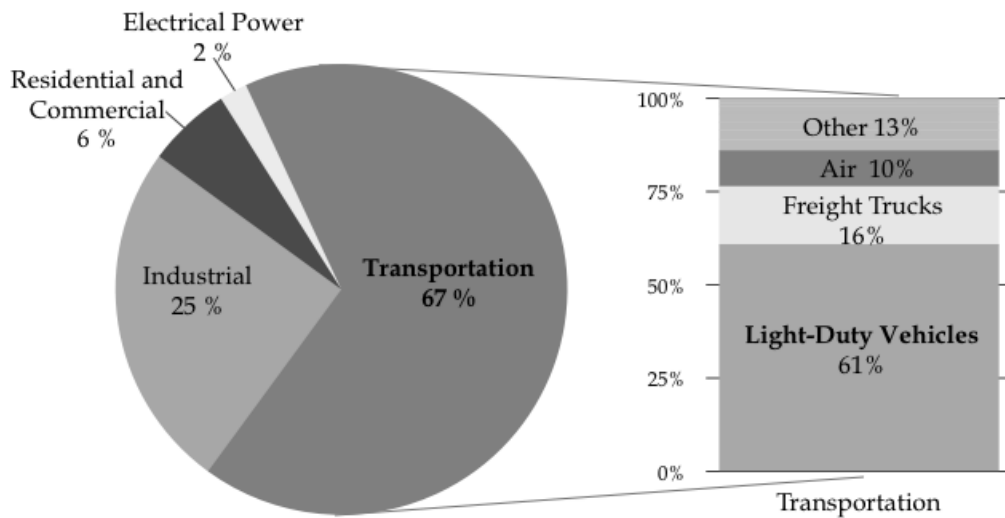


Figure 7. Types of Transportation Sector Oil Use (From Hauenstein, 2008)

Dealing with this issue of identifying and removing the policy impediments to auto fuel efficiency may be one of the most significant and productive steps that could be taken to address the larger issue of ending dependence on Middle Eastern oil. If the United States is able to make significant progress in reducing oil consumption, then it might be able to wean the economy off most foreign oil and only rely upon stable North American supplies of fuel.

VII. POLICY OPTIONS ANALYSIS

The skylines lit up at dead of night, the air-conditioning systems cooling empty hotels in the desert, and artificial light in the middle of the day all have something both demented and admirable about them: the mindless luxury of a rich civilization, and yet of a civilization perhaps as scared to see the lights go out as was the hunter in his primitive night.

—Jean Baudrillard
America
1989

A. DEFINE THE PROBLEM

The problem is that the United States is at risk of a terrorist attack in the homeland and abroad. The organization or movement that poses the greatest risk of terrorism directed against the United States is radical Islam. While other organizations and movements—both domestic and international—also pose a risk to America, it can be said with relative certitude that transnational radical Islam in its various forms constitutes the greatest risk in the near term. Another important aspect of this risk is what the late Osama Bin Laden told the world in his *fatwa* published in August 1996, that he would cause the United States to go into bankruptcy through its deliberate asymmetric warfare. He would force the United States to spend billions of dollars on homeland security and war fighting to counter the few million spent by al-Qaeda in terrorist attacks. According to the *Huffington Post*, the United States has spent \$1.28 trillion in the 3,519 days of the Global War on Terror from September 11, 2001 to Bin Laden's death on May 1, 2011 (Stein, 2011).

In summation, the problem is the United States is dangerously dependent on oil from the Middle East and Gulf region. Dependence on oil from the Middle East and Gulf may be the single most important problem facing America (Smally, 2004).

B. ASSEMBLE EVIDENCE

The assembled evidence is shown within the analysis and discussion of each of the policy options.

C. CONSTRUCT ALTERNATIVE SOLUTIONS

1. Option One: Status Quo

The status quo option would essentially continue the same policy, as has generally been the case over the past four decades. This position relies on current CAFÉ regulations for auto emissions and mileage. It has also included continuing statements by political leaders, especially during campaign season, about the importance of achieving vital national security interests through energy independence.

2. Option Two: Increase Motor Fuel Consumption Taxes to Reduce Consumption

Increasing motor fuels taxes may hold merit for causing a significant change in consumer behavior as witnessed by the fuel consumption patterns in most of the industrialized nations of the world. This option is grounded in the price elasticity of motor fuels and the availability of alternative transportation. This policy option also relies on the government not blocking innovative transportation and fuel source solutions, such as diesel fuel for hyper-mileage cars.

3. Option Three: Increase CAFÉ Targets to Reduce Consumption

This option would raise CAFÉ fuel mileage targets over time to a level that is well beyond any current or planned CAFÉ mileage goals. It appears that the Obama administration is placing a high degree of faith in this policy option; however, today's CAFÉ standards and the currently stated future CAFÉ goals are not sufficient to make the kind of impact on motor fuel consumption that will be required to eliminate oil imports from beyond North America.

4. Option Four: Craft Mutually Supportive Environmental and Energy Policies That Do Not Inhibit but Rather Encourage and Support Achievement of Hyper-Efficient Autos to Reduce Consumption

Option four would create mutually supportive environmental and energy policies in a fully coordinated manner to achieve national goals for energy security. The focus is on auto mileage, as the surface transportation sector is the single largest consumer of oil. This policy option would ensure that policy in one domain does not interfere with goal attainment in another area.

D. CRITERIA BY WHICH THE FOUR POLICY OPTIONS SHALL BE EVALUATED

1. Technical Effectiveness

The preferred solution should be technically sound and actually achieve the policy outcomes desired. To score high in technical effectiveness, the solution options should meet the rigorous fuel consumption performance goals.

2. Technical Feasibility

Each of the solution options considered must be technically feasible or be doable under the current state of technology. No technological reasons should be presented as to why a selected alternative cannot be expected to achieve a satisfactory solution to the challenge of drastically reducing automotive fuel consumption in the United States.

3. Political Feasibility

Alternatives considered must be politically feasible before they could be implemented nationally on a scale that would actually address the problem. It would not matter if the solution were sound and elegant in every other respect if it were not politically feasible and could not be implemented.

4. Popular Support

It would be helpful to have broad popular support for the preferred solution option, as it would make implementation simpler and easier. However, popular support is not 100% necessary, as can be seen with other unpopular national programs but are generally accepted by the public at large as necessary to the public good. An example is the national income tax. While this most important and largest tax paid by the public is not particularly liked by most, it is still widely supported as a necessary and proper method of funding the government.

5. Timeliness

Effectiveness over medium term (five to 15 years)—This criterion is inserted into the analyses to ensure that the preferred solution option is able to achieve the desired goal within a reasonable time period. If the solution would take significantly longer than this midrange time period, then it would not make much of a difference in the U.S. homeland security posture that could mobilize public opinion or political support for its implementation.

6. Impact on Economy

The preferred solution option should not have a deleterious effect on the U.S. economy. In fact, it should have a positive impact on Gross Domestic Product (GDP). Any solution should avoid negative economic impacts to achieve support and acceptance under previously stated criteria, such as political and popular support.

E. PROJECTED OUTCOMES FOR ALTERNATIVE SOLUTIONS

1. Option One: Status Quo

a. Technical Effectiveness

No evidence exists to suggest that continuing to do the same thing under a status quo scenario, in the absence of any policy reform or change, would generate the type of altered consumption behaviors that could represent a

solution to the problem of America's lack of energy security and the impact of that problem on homeland security. No logical reason is apparent to believe that doing the same thing will lead to a different outcome. In terms of effectiveness, Option One offers minimal prospects for goal attainment in energy security or homeland security. Unfortunately, the status quo has proven to be a policy failure over the past four decades in that the United States actually increased oil imports each decade from the 1970s to the 2000s. Substantial evidence exists that the status quo is not meeting the stated goals of American leadership when current and past presidents, leaders of Congress and other opinion leaders have called for U.S. energy independence or energy security.

Score: Low

b. Technical Feasibility

In terms of technical feasibility, Option One does not pose any implementation problems as it does not offer any new systemic technological solution or challenge. That said; the score for technical feasibility is low because it does not offer any structured way to move toward the goal of reduced dependence on foreign oil.

Score: Low

c. Political Feasibility

The projected outcome for Option One in the area of political feasibility is high because this option is already in place, and therefore, nothing needs to be done to initiate a new policy regime. While the political feasibility is high for policy option one, this option does essentially nothing to move the United States toward a more secure homeland through a more rational energy consumption pattern. However, the score in this criterion is high. Possibly, the principle reason that this option scores high in political feasibility is that the policy extracts no political pain. In addition, it is also possible that the general public does not make the connection with the dangers of inaction on homeland security.

Score: High

d. Popular Support

Popular support for Option One could be assumed to be moderate because the public has not displayed much in the way of unified or sustained concern about the current policy. It may be that such policy concerns are simply not on the radar of the general public until fuel prices at the pump go above \$4.00 per gallon as was the case in the mid-2000s. Again, when pump prices go back down to near former levels, the public outcry subsides, and again, this issue does not draw great public scrutiny. It is interesting to notice, however, that when prices go down, they rarely go all the way back to previous levels. Thus, the next round of price increases and retreats leaves the public paying more than before.

Score: Moderate

e. Timeliness

In the area of timeliness, Option One scores poorly and it could not be expected to make a positive impact in the mid-term or any other time period. In the area of minimizing negative impacts, Option One again scores poorly as it does not offer solutions to the negative impacts of growing dependence on Middle Eastern oil.

Score: Low

f. Economic Impact

Policy Option One would not be expected to have much of an impact on the U.S. economy, as it essentially would not change anything. It would be expected that fuel consumption patterns and business innovation and technological advances would not be affected one way or another under the status quo policy option.

Score: Low

2. Option Two: Increase Motor Fuel Consumption Taxes to Reduce Consumption

This option of increasing motor fuel consumption taxes to, or above, the levels of taxation in Europe could be an effective and even elegant solution to the problem. The option is simple and it could be quite effective. However, it could only be a solution if it were both politically feasible and if it could garner wide popular support. Many Americans consider very low gas prices to be a birthright (Thompson, 2011). Many politicians continually bemoan “high gas prices” when the fact is U.S. gas and diesel prices are very low when compared to the rest of the industrialized world. Moreover, those low prices are clearly part of the problem. Americans simply do not have a strong incentive to conserve fuel. It can be seen in the price spike of 2008 that consumer behavior does change and people drive less when fuel prices raise to a level that causes a rational change of driving patterns. Many European countries are paying nearly \$9.00 per gallon for fuel and more than half of that pump price is in the form of various taxes. As of May 2011, the federal tax on gasoline is 48 cents per gallon (not including state and local taxes). It is no wonder why Europeans purchase and drive autos that average more than 50 MPG compared to the auto fleet that averages less than 25 MPG in the United States. The price elasticity of gasoline is somewhat low. However, a history of empirical data shows that when fuel prices increase, demand for gasoline decreases but at a lower percentage than the increase in price. Much of this low price elasticity occurs because few substitutes are available for the utility provided by motor fuels. In areas in which very good public transit is accessible, an increase in transit ridership, and fewer VMT ensue. This result was pronounced in 2008.

Another area of concern with this policy option is it does nothing to remove the impediments in the form of overly strict and inflexible regulations to optimized fuel efficiency in the transport sector. These environmental regulations that impose obstacles to energy self-sufficiency remain under this otherwise elegant policy option.

The Declining Price Elasticity of Gas (Yglesias, 2011)

According to research by UC Davis's Jonathan Hughes, Christopher Knittel and Daniel Sperling, Americans are now less responsive to increases in gas prices. In the late 1970s, a ten percent rise in the cost of gas would lead to about a three percent decline in the amount of gas consumed. In the early 2000s, on the other hand, gas prices would have to rise about 60 percent to provoke a similar decline in gas consumption. The researchers theorized that this might be because spending on gas is now a smaller fraction of total monthly income or because cars get better mileage now, meaning that cutting back on driving saves less gas than it would have in the 1970s. But either way, their research suggests that even if gas prices go higher, we're unlikely to see Americans buying less gas. To be precise, it does not say people won't buy less gas even if prices rise, it says that the impact on driving will be relatively small. And since households are income constrained, that means the impact on spending on everything that's not gasoline will be relatively large. I would flag as a causal factor here the fact that residential patterns have shifted in favor of a larger share of the population living in places where there are fewer good alternatives to car commuting. You might respond to higher prices by driving to the commuter rail station instead of driving all the way to the office, but you can only do that if you live in a metro area with a commuter rail network.

Figure 8 is from an article in the CATO Institute's website entitled "Gasoline Prices in Perspective" (Taylor & Van Doren, 2006) by Jerry Taylor and Peter Van Doren.

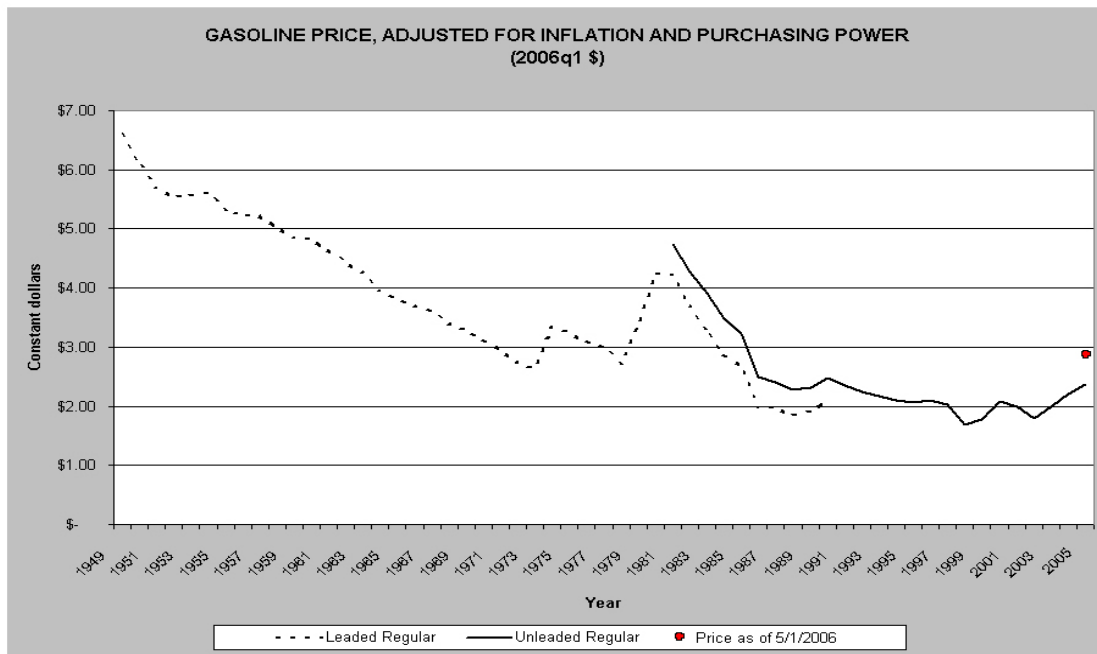


Figure 8. Gasoline Price, Adjusted for Inflation and Purchasing Power
(From Taylor & Van Doren, 2006)

In Figure 9, total fuel prices are in red and all taxes are shown in blue for several countries (Thompson, 2011).

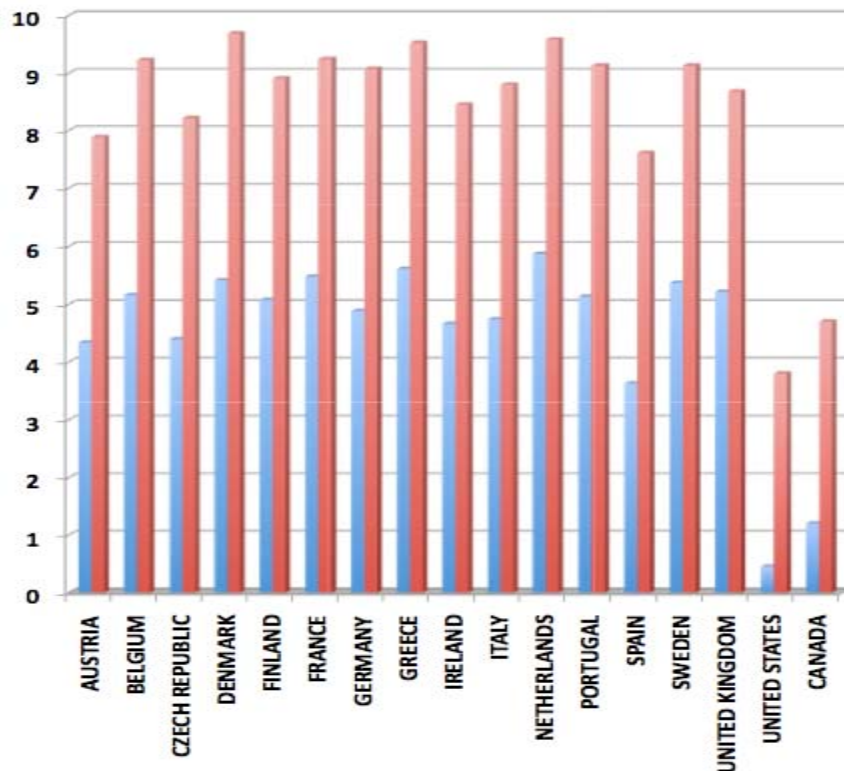


Figure 9. Total Fuel Prices and Taxes (From Thompson, 2011)

Figure 10 shows the primary cost components of gasoline in the United States in May 2011 (Thompson, 2011).

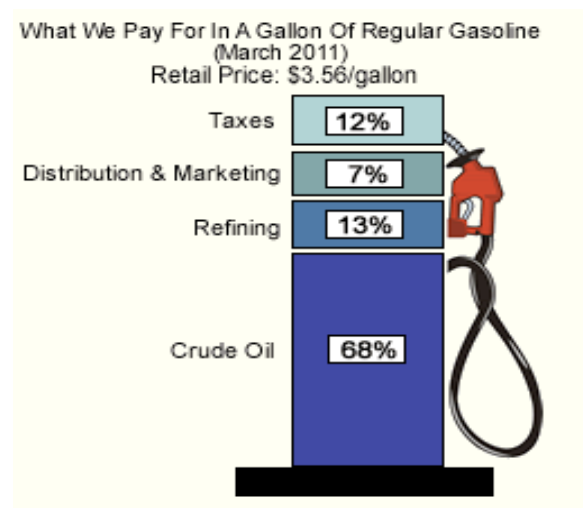


Figure 10. Primary U.S. Cost Components of Gasoline in May 2011 (From Thompson, 2011)

a. *Technical Effectiveness*

Option two, increasing the fuel tax, could be a moderately technically effective solution based on the literature regarding the elasticity of demand for motor fuels. While clearly some demand elasticity exists, and discretionary spending on motor fuels is dependent on total price at the pump, it may be the case where an increase in fuel price would cause consumers to shift their spending choices to reduce consumption of other items and continue to spend what is necessary on fuel to maintain their travel patterns. However, again, an increase in the price paid at the pump would be expected to reduce discretionary travel by car. Vacations would be taken closer to home and trips would be consolidated. That said, many communities in America do not have robust public transit and average home to work commutes in the United States are longer than in many other industrialized nations, which leaves the car as a primary mode for work commutes and business travel. While increasing taxes could be an elegant solution to energy security, in the absence of reforms to regulations that inhibit optimum efficiency, this effort could only be a half measure. Increasing taxes on motor fuels can be a moderately effective way to achieve the goal of U.S. energy security, and at the same time, reduce motor fuel environmental impacts.

Score: Moderate

b. *Technical Feasibility*

The technical feasibility of increasing taxes on motor fuels can be a moderately attractive solution, in that past experience has indicated that some elasticity exists in demand for motor fuels dependent on price. Also, the experience of other industrialized nations also shows that higher pump prices motivate people to make consumption decisions in relation to how they choose to make trade-offs between consumables. Therefore, with that background, it can be assumed that the policy option of increasing motor fuel taxes to a level that can cause changes in consumption patterns can be successful. What moderates

the efficacy of this policy choice is again, the issue of environmental restrictions on hyper-fuel vehicles and fuel choices. Thus, this policy option, even if a high degree of fuel price dependent demand elasticity did exist, would only be a half solution because it fails to address the issues of allowing innovation for optimum hyper-mileage vehicles, such as the plug-in diesel-electric hybrid car.

Score: Moderate

c. Political Feasibility

It would be extremely difficult of any political leader to survive long in office if this leader were perceived to be the person who raised fuel prices on the U.S. public. Cheap fuel is the holy grail of American politics and he who goes against that notion does so at his peril. America has developed a culture that says cheap fuel prices are an American birthright (Elboghdady, 2005). Any overt efforts to challenge that perceived birthright would surely be met with strong resistance.

Score: Low

d. Popular Support

Popular support for increasing taxes on gasoline would be about as strong as support for mandatory root canals for all drivers. With the magnitude of the perception problem in mind, it might be possible for a remarkably able and admired national leader of enormous stature to convince the general public that incrementally raising motor fuel taxes would be sound public policy and in the best interest of all Americans, but that leadership task would be a daunting one for even the very best leaders this nation has ever produced. It could be possible for an exceptionally charismatic leader to explain to the public and convince the population it is imperative that the United States achieve energy security. It might be possible to craft the argument for higher fuel taxes in terms of national security and as a chance for all Americans to do their part in the effort against international terrorism. Such an effort may have been possible right after

September 11, 2001, but as the events of 9/11 fade with time, it would be more difficult to convince people that achieving energy security is vital to their interests.

Score: Low

e. *Timeliness*

The timeliness of a solution based on increasing motor fuel taxes could be reasonably rapid if people had a choice of purchasing cars that attained hyper-mileage. It would be assumed that any proposal to increase motor fuel taxes dramatically to the point of European pump prices would need to be phased in over a period of years. With Americans holding on to their autos for about five and a half years, it would take at least that long for this initiative to achieve a major impact on fuel consumption (Hirsch, 2012). This period of time is not an unreasonable period given the magnitude of the challenge but without lifting environmental restrictions on innovation for hyper-mileage cars, the timeliness would only be moderate.

Score: Moderate

f. *Economic Impact*

The economic impact of paying more in taxes could have a sound effect on the ability of government to fund several infrastructure development projects and stimulate the economy. At the same time, the private sector could experience a down turn in economic output, as fewer resources would be available to the private sector. This solution of increasing motor fuel taxes could have a moderate impact on the economy, as trade-offs are likely between the public and private sectors (Plummer, 2013).

Score: Moderate

3. Option Three: Increase CAFÉ Targets to Reduce Consumption

One of the more interesting ideas associated with the increase in CAFÉ numbers is they apply to producers of autos but not to purchasers; therefore, ostensibly only one side of the business transaction is affected. A company can

build high mileage cars but if no one wants to buy them, then they do not move the producer toward meeting the CAFÉ goals. Increased CAFÉ goals seem to be the same as a government regulation requiring all people to be tall and good looking. Nice thought but it may not have much bearing on the issue or results. Little reason exists to assume that increasing CAFÉ numbers in the absence of any policy reform to remove the impediments to hyper-mileage would impact consumption behaviors in the amount necessary to be a real solution to the problem. Over the past three decades under the CAFÉ regime, fuel consumption has actually increased in the United States. Moreover, auto companies have continued to seek waivers and delays, and other ways of getting around the CAFÉ targets because they have been unable or unwilling to be fully successful in meeting the requirements of the program. Auto companies may have also been actually prevented from using the most effective technology available due to possibly overbearing environmental regulations.

Understanding CAFÉ (Heartland Institute, n.d.)

CAFE standards, created by the 1975 Energy Policy Conservation Act, require manufacturers to achieve minimum targets for average fuel economy, expressed in miles per gallon (MPG). CAFE currently mandates fuel economy of 27.5 MPG for passenger cars and 22.2 MPG for light trucks, rising for light trucks to between 21.3 and 28.4 MPG by 2011, depending on the size or “footprint” of the vehicle. The 2007 Energy Independence and Security Act (EISA) requires new cars and light trucks sold in 2020 to deliver a combined fleet average of 35 miles per gallon.

Under rules proposed by the Department of Transportation in April 2008, fleet-wide fuel economy would increase by 4.5 percent annually through 2015. For passenger cars, fuel economy would rise from the current 27.5 MPG to 35.7 miles per gallon by 2015, while for light trucks, fuel economy would rise from 23.5 MPG in 2010 to 28.6 MPG in 2015 (Peters 2008). California is seeking a waiver from EPA to impose even higher standards.

EPA, NHTSA Issue Proposed GHG and Fuel Economy Rule for 2017–2025 Light-Duty Vehicles (Georgetown Climate Center, 2011)

On December 1, the Environmental Protection Agency (EPA) and the National Highway Transportation Safety Administration (NHTSA) issued a proposed rule to further reduce greenhouse gas emissions and improve fuel economy for light-duty vehicles for Model Years (MY) 2017-2025 (76 Fed. Reg. 74854, 75420). The agencies announced the proposed standards in a Supplemental Notice of Intent (NOI) in late July, and originally hoped to issue the proposed rule by late September.

NHTSA's proposed corporate average fuel economy (CAFE) standards would require an average fleet-wide basis of 49.6 MPG by 2025, while EPA's proposed standards would require lower fleet-wide emissions of carbon dioxide, equivalent to 54.5 MPG if this level were achieved solely through improvements in fuel efficiency. The combined standards under the proposed rule will achieve an average fleet-wide fuel efficiency of 54.5 MPG by 2025, an increase of roughly five percent annually for passenger cars. Light trucks will have a lower target of 44 MPG, and passenger cars will have a higher goal of 62 MPG by 2025. The combined standards would reduce the amount of GHG emissions by half for MY 2025 light-duty vehicles, compared to MY 2010 vehicles, and EPA estimates that the standards will save four billion barrels of oil over the lifetime of MY 2017-2025 vehicles. CAFE standards are currently set at just over 27 MPG, and are scheduled to reach 35.2 MPG by 2016.

NHTSA has the authority to establish CAFE standards under the Energy Policy Conservation Act, and EPA has the authority to regulate carbon dioxide and other greenhouse gas as pollutants under *Massachusetts v. Environmental Protection Agency*, (549 U.S. 497 (2007)). EPA and NHTSA have worked closely with the California Air Resources Board (ARB), and ARB recently released a proposal for MY 2017-2025 emissions standards that are consistent with the proposed national standards. California has unique authority under the Clean Air Act to seek a waiver to implement more stringent air pollution standards for motor vehicles, and EPA granted California a waiver for GHG regulations for MY 2009-2016 light duty vehicles on July 8, 2009 (74 Fed. Reg. 32,744). At the same time California worked with EPA and NHTSA to develop a single nationwide federal standard for MY 2012-2016, and subsequently accepted the federal standards that were finalized May 7, 2010 (Joint Light-Duty Vehicle GHG Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324).

Figure 11 is from the Wikipedia article on “Corporate Average Fuel Economy (CAFE)” (Wikipedia, 2011a).

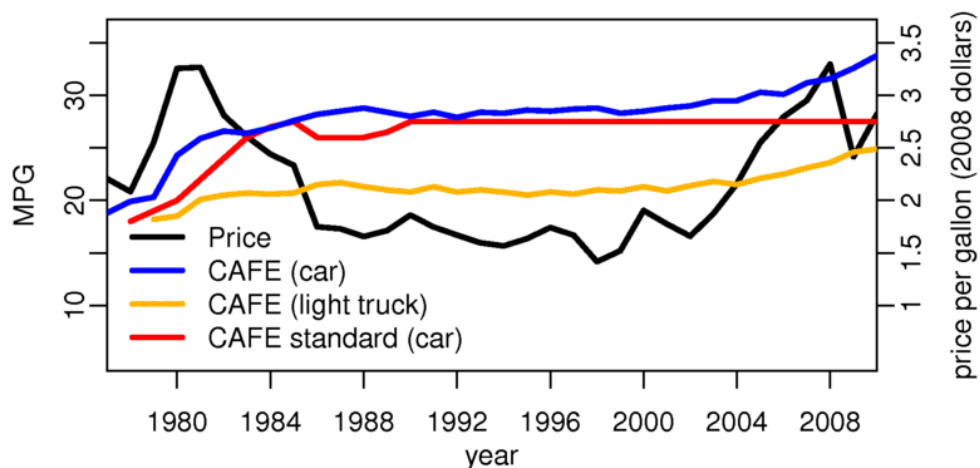


Figure 11. CAFE Standards (From Wikipedia, 2011a)

Table 1 is also from the Wikipedia article on “Corporate Average Fuel Economy (CAFE)” (Wikipedia, 2011a).

CAFE Standards for Each Model Year in Miles per Gallon				
Model Year	Passenger Cars	Light Trucks		
		2WD	4WD	Combined
1978	18.0			
1979	19.0	17.2	15.8	17.2
1980	20.0	16.0	14.0	
1981	22.0	16.7	15.0	
1982	24.0	18.0	16.0	17.5
1983	26.0	19.5	17.5	19.0
1984	27.0	20.3	18.5	20.0
1985	27.5	19.7	18.9	19.5
1986	26.0	20.5	19.5	20.0
1987	26.0	21.0	19.5	20.5
1988	26.0	21.0	19.5	20.5
1989	26.5	21.5	19.0	20.5
1990	27.5	20.5	19.0	20.0
1991	27.5	20.7	19.1	20.2
1992	27.5			20.2
1993	27.5			20.4
1994	27.5			20.5
1995	27.5			20.6
1996	27.5			20.7
1997	27.5			20.7
1998	27.5			20.7
1999	27.5			20.7

CAFE Standards for Each Model Year in Miles per Gallon				
Model Year	Passenger Cars	Light Trucks		
		2WD	4WD	Combined
2000	27.5			20.7
2001	27.5			20.7
2002	27.5			20.7
2003	27.5			20.7
2004	27.5			20.7
2005	27.5			21.0
2006	27.5			21.6
2007	27.5			22.2
2008	27.5			22.5
2009	27.5			23.1
2010	27.5			23.5
2011	30.2			24.1

Table 1. CAFE Standards for Each Model Year in Miles Per Gallon
(From Wikipedia, 2011a)

Table 2 also derives from the Wikipedia article on “Corporate Average Fuel Economy (CAFÉ)” (Wikipedia, 2011a).

2011–2025 CAFE Standards for Each Model Year in Miles Per Gallon								
Model Year	Passenger Cars				Light Trucks			
	“footprint”: 41 sq ft or smaller (e.g., 2011 Honda Fit)		“footprint”: 55 sq ft or bigger (e.g., Mercedes-Benz S-Class)		“footprint”: 41 sq ft or smaller (e.g., Nissan Juke)		“footprint”: 75 sq ft or bigger (e.g., Ford F-150)	
	CAFE	EPA Window Sticker	CAFE	EPA Window Sticker	CAFE	EPA Window Sticker	CAFE	EPA Window Sticker
2012	36	27	28	21	30	23	22	17
2013	37	28	28.5	22	31	24	22.5	17
2014	38	28	29	22	32	24	23	18
2015	39	29	30	23	33	25	23.5	18
2016	41	31	31	24	34	26	24.5	19
2017	44	33	33	25	36	27	25	19
2018	45	34	34	26	37	28	25	19
2019	47	35	35	26	38	28	25	19
2020	49	36	36	27	39	29	25	19
2021	51	37	38	28	42	31	25	19
2022	53	38	40	30	44	33	26	20
2023	56	40	42	31	46	34	27	21
2024	58	41	44	33	48	36	28.5	22
2025	61	43	46	34	50	37	30	23

Table 2. 2011–2025 CAFE Standards for Each Model Year in Miles Per Gallon (From Wikipedia, 2011a)

a. Technical Effectiveness

In terms of effectiveness, Option Three offers moderate prospects for goal attainment in energy security or homeland security. In many ways, Option Three is similar to Option One, status quo, in that the first option also

primarily relies on CAFÉ to ameliorate the problem. Moreover, again, as in the status quo, America's dependence on foreign oil has dramatically increased over the years under the CAFÉ regime. From a technical standpoint, it is not a difficult proposition simply to raise CAFÉ standards. The question is, will raising these CAFÉ requirements actually make a significant difference on overall goal attainment?

Score: Moderate

b. Technical Feasibility

In terms of technical feasibility, Option Three does not pose any problems, as it does not offer any technological solution; rather, it imposes standards and expects industry to come up with the solutions in ways similar to the past nearly 40 years. If auto companies could be innovative, and design and produce the most efficient powertrains available today, then the technology is ready to support significant increases in fuel efficiency. However, under the current environmental regulations on diesel fuel emissions, it is not economically feasible for industry to produce these hyper-mileage cars. The best that could be expected from increasing CAFÉ standards is an incremental approach to more of the same, and remember, U.S. dependence on foreign oil has significantly increased since CAFÉ regulations were first introduced in 1975.

Score: Moderate

c. Political Feasibility

The projected outcome for Option Three in the area of political feasibility is moderate to good because political leaders recognize this option as essentially continuing on an incremental and low political risk path to appear as though they are addressing the problem. From a political standpoint, leaders can appear to be doing something important for energy independence through raising the CAFÉ standards, but the true impact of this approach remains to be seen. However, a more informed public may not agree with this path if they understood

the real impact on the nation's well-being or failure to achieve energy security. Again, in this situation, real leadership is indispensable to this calculation.

Score: Moderate

d. Popular Support

Popular support for Option Three could be assumed to be moderate because the nation has been on this path for some time. Again, if the public expects political leaders to take action to address the issue of American energy security, then popular support could be diminished. Even though many citizens may not have “connected the dots” by drawing the connection between importing vast quantities of oil from the Middle East and terrorism, they do suspect that being reliant on this unstable foreign oil is fundamentally not in the best interest of the nation. Therefore, in terms of popular support, Option Three may not do well.

Score: Moderate

e. Timeliness

In the area of timeliness, Option Three again scores in a moderate range, and it could not be expected to make a positive impact in the mid-term or any other time period. The United States has been trying Option Three since 1975, and the nation is now more dependent on foreign oil than it was when the CAFÉ program began (with a temporary blip due to the recent recession).

Score: Moderate

f. Economic Impact

It is possible that further increasing CAFÉ standards could have a negative impact on the economy. Much higher CAFÉ standards could have the effect of slowing overall economic growth, especially because the auto sector is one of the largest sectors in the U.S. economy. Inflexible CAFÉ standards could negatively impact the auto manufacturing industry to the degree that it actually slows the overall economy. This situation is exacerbated because auto company

profits are skewed toward the higher priced, high content vehicles, and these vehicles would be sold in smaller numbers under more strict CAFÉ regulations. The auto companies would largely be left offering their smaller, minimal content vehicles that have less profit potential for the companies. With less profit, the companies would not be able to spend as much on research and development (R&D) and retooling, all of which is primarily done in the domestic economy. In the area of minimizing negative impacts, Option Three again scores moderately as it does not offer solutions to the negative impacts of growing dependence on Middle Eastern oil. In fact, having been tried for more than 30 years, it could be said that CAFÉ is a proven failure. No reason exists to believe that even more CAFÉ would provide a solution when the past has been so disappointing.

Score: Moderate

4. Option Four: Craft Mutually Supportive Environmental and Energy Policies That Do Not Inhibit but Rather Encourage and Support Achievement of Hyper-Efficient Autos to Reduce Consumption

This option of developing mutually supportive environmental and energy policy in a fully coordinated manner holds potential to be an effective and innovative solution to the problem. This solution draws on the imagination of leaders to get at the fundamentals of the problem and create a path forward that provides hope to reduce the animosity of radical Muslims toward the United States and develop energy resiliency at home. This solution can only come about after America's national leadership postulates extraordinary vision to articulate the real clear and present danger of the current state of affairs in energy. These leaders must clearly inform the populous as to the seriousness of the situation and then help everyone "connect the dots" to see how America's energy dependence has contributed to the violence waged against the United States and how it threatens the future. This option could form a Cabinet level task force on energy security and the environment that could be led by the Secretary of Energy and the Secretary of Homeland Security as the co-chairs, and it would include the EPA administrator, senior officials from the Departments of Defense,

Agriculture, Interior and State, and other key officials, to give it a high profile and substantial administrative and political clout. Of course, the main advocate and a primary spokesperson for the policy would need to be the President and key leaders of Congress. It would also be important for this policy to be borne out of a bipartisan effort in Congress. A real and genuine bipartisan approach to a question of this magnitude would be essential for any hope of success.

It is essential that key leaders in industry and the environment enthusiastically embrace this policy for it to be successful. This policy initiative approach could be quite effective; however, it could only be a solution if it were both politically feasible and if it could garner wide popular support. Americans do not like to be told what they can buy and what they cannot buy. For a few centuries now, Americans have proven themselves to be a fairly independent lot. Therefore, it would be important for Option Four to be presented in a similar fashion as “rationing” was during World War II. It was presented to the people and was mostly embraced by the public as being necessary for the well-being of the nation during a time of grave danger. That same logic can be applied to the situation today with America’s dangerous dependence on Middle Eastern oil and the fact that the United States sends billions of dollars per year to regions of the world in which some of that money ends up in the hands of people trying their best to kill Americans. Additionally, under this policy option, people would still have the freedom to purchase any type of car they want—they would just have to pay a substantial fee for purchasing a gas guzzler. Consumers who choose to buy gas guzzlers would pay for the externality created by that decision. Likewise, people who elect to purchase a hyper-mileage car would be rewarded in the form of a rebate from the government fund, and this fund is capitalized by the people purchasing the poor mileage cars. Maybe most would think this intrusion into the free market a small price to pay for American energy security and a corresponding reduction in animus toward the United States.

a. *Technical Effectiveness*

This policy option appears to offer sound promise toward meeting the goal attainment of reducing dependence on dangerous forms of foreign oil, especially that from the Middle East. The most important aspects of this option is that it allows for American innovation to design, develop, and produce cars that achieve hyper-mileage and still be cars that can be attractive and of reasonable performance; in other words, highly marketable and desirable to the public. The technology to support this option was proven during the PNGV more than 15 years ago, and it has to be further proven by the recently developed VW XL1 that achieves more than 260 MPG. The technology exists today to achieve hyper-mileage.

Score: High

b. *Technical Feasibility*

Again, the feasibility of this technology is clear, as long as the environmental regulations in the United States do not pose obstacles to development. This policy option is designed as a joint effort between energy, security, and environmental interests. Thus, if these elements are working collectively and cooperatively, then the feasibility of this proven technology can be sound.

Score: High

c. *Political Feasibility*

Option four does interpose monetary fees and rebates into the auto purchasing proposal. This fact could make many people upset about government intrusion into the operation of the private sector. Again, strong leadership would be required at the national level to explain fully to the public that it is necessary to achieve a higher degree of homeland security through finally achieving energy security in this case. This leadership challenge would be significant, as it would be expected that certain segments of the public would strongly object to any form of government interference in the free market. It could then be pointed out that

government quite frequently interferes with the free exercise of decision making when it comes to auto transportation. All the traffic laws are an interference with the free exercise of how Americans operate their cars. Safety regulations require expensive auto equipment, such as air bags, seat belts, safety glass, and crash worthy bumpers. Environmental regulation mandate emissions controls on vehicles; thus, the government is already largely involved in the auto industry. If the connection between U.S. dollars going to the Middle East, and the cost of stationing U.S. military personnel in the region, on shore and off shore, was made very clear, it could conceivably make Option Four highly politically feasible.

Score: Moderate

d. Popular Support

Popular support might be closely related to the effectiveness of the leadership displayed in crafting and promoting the policy. It is clear that a major policy initiative of this scale would need to be highly bipartisan to gain popular support. If both Democrats and Republicans, and independents and libertarians and Greens, all coalesced around a policy proposal that would greatly reduce oil consumption and enhance homeland security, then this option could have a very solid chance of coming to fruition.

Score: Moderate

e. Timeliness

As the technology exists today to build hyper-mileage cars, this policy option could begin to produce the desired reductions in fuel consumption within a fairly short period of time. Also, because this option does not require any changes to national vehicle fueling infrastructure, it also contributes to an expectation that this option could be effective in beginning to reduce oil consumption within a year or two. Timeliness for this option is quite good.

Score: High

f. Economic Impact

Policy Option Four could have a solid positive impact on the U.S. economy. By spurring domestic energy production in the form of bio-diesel to be used in plug-in diesel-electric hybrid cars, this option could also have a great impact on American agriculture and agriculture in the western hemisphere where high sugar content crops do well, such as sugar cane in South America. It would also be expected that designing and developing these new plug-in diesel electric hybrid autos would create many jobs in the auto industry. This policy option could jump start a broad revival of the U.S. auto industry and have a significant positive impact on the U.S. economy.

Score: High

F. POLICY OPTIONS, MATRIX ANALYSIS

Table 3 shows the matrix analysis of alternatives against selected criteria (non-weighted).

The four policy alternatives are evaluated by their expected performance against the six criteria. In this non-weighted matrix, a scale of Low–Moderate–High is used with one representing the least effective and four the most overall, or total, effectiveness.

Total Effectiveness Matrix—Potential for Success Low-Moderate-High

Criteria	Status Quo A	Fuel Tax B	CAFÉ C	Environmental and Energy Policy D
1 <i>Technical Effectiveness</i>	Low	Moderate	Moderate	High
2 <i>Tech. Feasibility</i>	Low	Moderate	Moderate	High
3 <i>Political Feasibility</i>	High	Low	Moderate	Moderate
4 <i>Popular Support</i>	Moderate	Low	Moderate	Moderate
5 <i>Timeliness</i>	Low	Moderate	Moderate	High
6 <i>Economic Impact</i>	Low	Moderate	Moderate	High
Total	Low	Moderate	Moderate	High

Table 3. Options Analysis Effectiveness Rating

G. ANALYZE TRADE-OFFS BETWEEN OUTCOMES

It can be seen that trade-offs would be expected between and among the policy alternatives selected in this study. The science, art, and craft of decision support analysis offers numerous methods for modeling and quantifying projected outcomes and trade-offs in the policy field. Usually, an attempt is made to analyze policy outcomes and trade-offs that achieve the greatest good for society. In this sense, the outcomes may indeed not be considered Pareto Optimal as some people may not be better off than before the policy intervention (as could be the case when some people may want to purchase a high performance car but the new fee for low fuel efficiency would now preclude such a purchase). While society could be argued to be better off in total, some people consider themselves worse off so the Pareto Optimal test is not affirmed (“Pareto optimal,” n.d.).

Instead of a Pareto Optimal condition, this analysis of trade-offs and outcomes seeks a maximum utility position in the classic Utilitarian tradition of John Stuart Mill and Jeremy Bentham, albeit tempered with a strong sense of justice (Wikipedia, 2012). The trade-offs in these policy options include disposable income for higher fuel taxes, which would prove to be very unpopular with the general public and untenable for any member of Congress who would support such a proposal. Another trade-off would be continuing the status quo and spending trillions of dollars on imported oil, and a massive defense posture to guard the nation’s ability to secure those oil imports. This status quo position is one that does not seem to garner much attention from the public or the polity until supply is reduced and the price goes dramatically higher. Then, it moves to front and center on the political agenda with so-called “leaders” once again calling for action to reduce the price of gas at the pump. The usual answer for the high price is to tap into the U.S. Strategic Oil Reserve (Hargreaves, 2012). The U.S. Strategic Oil Reserve has been used as a policy football to kick around from time to time by both political parties, and Rep. Paul Ryan has recently characterized it as political “pixie dust” (Stephanopoulos, 2012).

Another policy trade-off could be freedom of choice for energy security. In Option Four, concerning the new mutually supportive policy initiative between environmental and energy policy, the consumer could consider it a form of extortion to be “forced” to purchase a lower powered auto to save fuel when really wanting a high powered car. This attitude is understandable, and it is a serious concern with Option Four. People do not like to be told what to do or what to buy (witness the recent uproar over New York’s ban on large fountain sugary sodas and the issue of baby formula vs. mother’s milk). It just rubs folks wrong to be told what to do by the government. However, it should be pointed out that in Option Four, it is still possible to purchase a high-powered car that gets poor fuel mileage but it would be necessary to pay the externality cost for that decision through a fee. Clearly, trade-offs do occur between and among these four policy options. Based on the criteria selected, however, a clear leader emerges as the best policy choice.

H. CHOOSE THE BEST SOLUTION

Policy Option Four, crafting mutually supportive environmental and energy policies that do not inhibit but rather encourage and support achievement of hyper-efficient autos to reduce consumption, emerges as the alternative of choice. This policy option is aimed at both increasing domestic production of energy and reducing impediments to conserving energy—with a focus on the transportation sector because that sector of energy consumption is the largest single user of oil.

...our perception of the ‘energy crisis’ is different from many. We feel that Americans have had too much fuel available, that less will be better. I see it as the ‘effects of too much energy’ crisis. With our bigger-is-better, disposable, nonrenewable energy past, I wonder if, in squandering fuel, we have not also subverted self-reliance, neighborly concern, the active appreciation of balance and harmony. I think confronting this legacy of too much, too soon would be the proper response to the energy crisis.

—Steven C. Wilson, Etheos Mountain Agriculture Institute,
quoted in *National Geographic Report on Energy*, February 1981

I. EXPLAIN RECOMMENDATION

The alternative selected, the policy option of crafting mutually supportive environmental and energy policies that do not inhibit but rather encourage and support achievement of hyper-efficient autos to reduce consumption, is potentially an effective policy choice. At the same time, it could clearly be viewed as controversial and even onerous to freedom or libertarian oriented Americans. Significant problems call for substantial solutions. U.S. dependence on oil from the Middle East and, therefore, the establishment of a large, and largely unwelcome footprint in that part of the world for many years, is one of the reasons that underpins the hatred of America by radical Islamists. Another reason, but certainly not the only reason, is an overbearing American presence in the land of the prophet, which has also caused such a high degree of animosity among some parts of the Muslim world toward the United States. The United States has and will most likely continue to support the State of Israel, which is the other major reason why some Arabs and Muslims harbor such a degree of animus toward America, but that issue is beyond the intentionally limited scope of this inquiry. This policy recommendation is an attempt to craft a real, workable, feasible, timely and effective solution to one of the most important policy issues facing the United States. Purchasing hyper-efficient cars may be part of the solution to energy security, and a very important part of the solution, to ending the requirement to send American service members to the Middle East. The seriousness of this issue cannot be overstated and the effectiveness of the proposed solution must be equal to the task.

VIII. RECOMMENDATIONS AND A PATH FORWARD TO PUT AMERICA ON THE ROAD TO ENERGY SECURITY AND THEREFORE ENHANCE HOMELAND SECURITY

Achieving U.S. energy security and its direct by-product of enhanced homeland security, is serious business and this nation must take the necessary steps to achieve this absolutely critical public policy goal. This country will either do what is necessary to achieve energy security or not. Therefore, it is essential that U.S. political and industrial leadership honestly address the problem with workable solutions instead of political platitudes as has been the case over the past four decades. The United States must clearly identify a strategic path forward designed to meet the goal of American energy security. The main discussion in this paper has centered on the notion that, without other interventions, motor fuel consumption is driven by price/cost either of fuel. The demand elasticity of fuels is such that a tipping point must be achieved before people modify their behavior to a degree that will make an impact on fuel consumption (Moffatt, 2009).

Molly Espey, published in *Energy Journal*. Espey examined 101 different studies and found that in the short-run (defined as 1 year or less), the average price-elasticity of demand for gasoline is -0.26. That is, a 10% hike in the price of gasoline lowers quantity demanded by 2.6%. In the long-run (defined as longer than 1 year), the price elasticity of demand is -0.58; a 10% hike in gasoline causes quantity demanded to decline by 5.8% in the long run.

For a wide range of reasons, it does not appear that the federal government would be able to raise the tax on motor fuels to the point at which they are in the EU, and thereby, be able to affect consumer demand through a much higher tax on fuels. Americans have been inculcated to believe that along with baseball and apple pie, they have a God given birthright to low fuel prices. Therefore, this recommendation for achieving U.S. energy security in terms of

motor fuels is a two-prong approach that uses the demand elasticity curve but without directly raising the sacrosanct fuel price.

Largely based on the experience of the EU nations, and their policies and programs for energy efficiency in the transport sector, two policy recommendations are suggested.

- Institute modest reforms, on a national basis, to eliminate unreasonable restrictions on using the most efficient vehicle technologies, designs, propulsion systems, and fuels.
- Institute a system of fees and rebates on automobile mileage to achieve a “hyper-mileage” fleet within 10 years.

An expanded discussion of these two policy recommendations follows.

First, eliminating unreasonable restrictions on using the most efficient vehicle technologies and designs will allow the development and marketing of vehicles that can achieve “hyper-mileage” by reducing the weight of the vehicles and allowing the most efficient power train technologies. A compelling argument exists for allowing relatively minor reform of both safety regulations that will allow lighter vehicles, and emissions regulations that will allow extremely efficient diesel engines. It should also be kept in mind that diesel engines can easily use various blends of biofuels, and the long-chain “bio” part of the blends are more common in naturally growing plants, and as such, diesel engines are better suited for adding a bio component to the fuel than are gasoline engines. Both these technology areas, lighter weight and diesel engines, are allowed in the EU and their national vehicle fleets are well on their way to achieving 50 MPG averages or double the U.S. numbers. The United States could cut the use of motor fuels for the passenger fleet by half over in a fairly short period of time if it followed the lead of the other industrialized nations in simply allowing cars that reach 50 MPG. Moreover, that level of fuel efficiency achievement could occur without the need to continue to the next step of combining a biodiesel engine with a hybrid system and braking energy recovery. Looking beyond diesel, hybrids are a step further by combining diesel engines with a “plug-in” type of hybrid that can easily achieve mileage in excess of 100 MPG today (Hyde, 2012).

Important ideas and new ways of thinking about the important issues that face the nation can be gleaned from other nations' approaches to policy issues. The EU nations and elsewhere are well ahead of America when it comes to the efficiency of their motor vehicle fleets. Their policies are driven by rationality and common sense, and are not overly dependent upon intractable conformity to environmental orthodoxy. Should the United States apply that same degree of reasoned judgment to policy formation in the crucial field of energy security and its impact on homeland security?

Making the vehicle lighter will require some minor modifications in Department of Transportation safety and crash worthiness standards but they would not be excessive or unreasonable. In addition, if all cars were lighter over a period of time, then safety is increased in vehicle-to-vehicle collisions, which is a major problem when a very heavy vehicle collides with a very light vehicle, as the laws of physics cannot be repealed. If safety regulations were developed to move to lighter vehicles and safety systems and requirements incrementally, it would go a long way toward achieving hyper-mileage. If the United States is to achieve hyper-mileage, the laws of physics must be followed, since moving a heavy mass requires more energy than moving a light mass.

Secondly, and possibly more challenging, is the recommendation to allow diesel engines in passenger cars throughout the nation with one federal regulation and standard that cannot be superseded by any state. California has tried, and largely succeeded, in setting tougher, although questionably rational, emissions standards than the federal EPA. It was demonstrated in the Clinton Administration's "partnership for a new generation of vehicles" that 80 MPG vehicles were feasible more than a decade ago. Each of the Detroit big three auto companies produced a prototype that achieved between 72 MPG and 80 MPG in a full size four-door family sedan. These autos were diesel-electric plug-in series drive hybrids and they all achieved the goals of the government funded development program. These two initiative areas would allow the type of vehicle by weight and propulsion system that would meet energy efficiency goals to allow

the United States to achieve energy security. With advances in technology over the past decade, 100 MPG is easily achievable today in full size family four-door sedans.

The next part of the policy recommendation is instituting a fee and rebate schedule on cars when they are sold, and when they are re-registered each year. The fee and rebate schedule, known as Feebates, would charge a graduated fee on cars based on the tested fuel mileage. A substantial fee would be charged for poor mileage and a sizable rebate received for excellent mileage. This graduated fee and rebate schedule would be adjusted upward each year over a 10-year period until most of the fleet met at least a 100 MPG standard.

While a high tax large enough to cause the demand shift to hyper-mileage cars is not feasible, this fee and rebate scheme is feasible because people still have the choice to buy the kind of car they want and can afford. If a gas guzzling large SUV is desired, then go ahead and buy one. The extra social cost (externality) of using all that fuel that runs the risk of oil dependency on the Middle East would have to be paid. This social cost will be levied in the form of an additional fee at purchase and each year at registration. If a car that gets 100 MPG is wanted, then go ahead and buy one. This positive contribution to society, or “Act of Patriotism” as President Carter called it, will be rewarded with a large rebate at purchase and each year at registration. The legislation that creates the Feebate program would need to include a provision that would allow the administration to adjust the fees and rebates from time to time to ensure that the program continues to be effective in reducing fuel consumption on American roads.

These two policy recommendations are designed to contribute to American energy and homeland security by addressing one of the major sectors using vast amounts of petroleum. The recommendations are feasible and achievable.

IX. THE TECHNOLOGY

There is an internal dispute between those who imagine the world to suit their policy, and those who correct their policy to suit their realities of the world.

—Albert Sorel, French Historian (1842–1906)

Many U.S. leaders have stated over the past few years that one of the most important things this nation can do for homeland security is to “get off foreign oil and achieve energy independence.” While complete energy independence is certainly a laudable goal, it may be more achievable and practical to deal with this challenge by thinking and acting in terms of “energy security.” What is meant by energy security is that the United States reduces oil consumption to the point at which only petroleum is required from this nation’s close allies and neighbors, Canada and Mexico. It is important to note that this issue only deals with petroleum and natural gas and no other form of energy. By taking deliberate and thoughtful steps to reduce oil consumption to sustainable levels, the United States will eliminate the need to import energy from suspect suppliers and greatly enhance the reliability of long-term oil supplies. Indeed, attaining energy security may be the single most important thing the United States can do for homeland security (Brannan, 2009c).

Developing national policies that allow the United States to achieve this goal of energy security—in the petroleum component of the energy mix—is a national and homeland security imperative. Reducing U.S. petroleum consumption to a level at which the nation only needs to import oil from Canada and Mexico would achieve the following key objectives.

- Eliminate oil imports from unstable parts of the world
- Eliminate oil imports from unreliable trading partners
- Greatly reduce the flow of U.S. currency to parts of the world that are known to support terrorism, terrorist organizations and networks, or other radical agendas
- Reduce funding for terrorism

- Reduce the need for direct U.S. involvement in securing the free flow of oil from the Persian Gulf
- Enhance the economic well-being of Canada and Mexico, which is in the direct interest of the United States
- Reduced vulnerability to disruptions in the flow of oil into the United States
- Significantly enhance air quality by reducing the need to move oil by ship (pipelines are an order of magnitude more secure and environmentally sound way to move oil)
- Makes more dollars available in the United States for other pressing national issues
- The United States becomes a leader in developing and producing hyper-mileage cars and light trucks

The key to achieving these very important national goals is through a serious reduction in oil consumption. While petroleum is used for a vast array of commercial purposes, one of the largest components of oil use in the United States is to fuel the transportation sector. Home heating, operating plants and manufacturing processes, the aviation sector, marine fuels, petro-chemicals and other uses of oil are important. However, the United States can achieve significant reductions in consumption in the surface transportation sector. Furthermore, it can be achieved using already been proven technology, and can be widely available in the short to medium term.

A. TECHNOLOGICAL ISSUES

Numerous technologies may contribute to achieving overall U.S. energy security. This section concentrates on those that can reduce fuel consumption in the motor vehicle sector. These technologies include the following.

- Hydrogen fueling infrastructure
- Development of coal to liquid fuel projects
- Development of biofuels
- Hybrids, both diesel and conventional
- Electric vehicles

- Development of GDiesel (this can be especially important in light of the recently expanded natural gas development and production in the United States)
- Development of advance bus, medium and heavy truck fuel efficiency
- Further development of highly efficient biofuel compression ignition engines
- Further development and production of clean natural gas

Again, this inquiry is purposefully limited in scope to only address some details concerning passenger car and light truck technology that can contribute to energy security.

B. ENHANCING HOMELAND SECURITY BY CRAFTING A PATH TO U.S. ENERGY SECURITY

If the United States could reduce its oil consumption by 30%, it would not need to import any oil from countries other than Canada and Mexico. Currently available technology, if implemented, can achieve this reduction in 10 years. However, this decrease requires the adoption of a deliberate national policy to free up the use of available solutions and technologies in oil consumption.

Every U.S. president since Richard Nixon has stated that the nation must wean itself from foreign oil. All U.S. presidents and most leaders of Congress have stated that dependence on foreign oil is a national security imperative. It is important to note in the most recent presidential election that both Governor Romney and President Obama campaigned on energy independence. It can be stated that “in part” what is currently preventing U.S. energy security is “policy in conflict,” and the next administration and the next Congress must address this issue.

In the first year of President Clinton’s first term, an aggressive energy initiative was undertaken designed to deliver practical and affordable full size family cars that would achieve 80 MPG (The White House, 1993, p. 1). The PNGV was a R&D program funded by the U.S. Department of Energy (DOE) and it involved the major American auto companies, and major research institutions

to establish U.S. leadership in fuel-efficient (up to 80 MPG) vehicles while retaining marketable and affordable features. The PNGV, formed in 1993, involved eight federal agencies, the national laboratories, universities, and the U.S. Council for Automotive Research (USCAR), comprised of DaimlerChrysler, Ford, and GM. On track to achieving its objectives, the program was cancelled in 2002 by the Bush administration and at the request of the automakers, with some of its aspects shifted to the much more distant FreedomCAR program. One of the primary reasons for this change in direction was substantial pressure from environmental groups (Yacobucci, 2002).

The program was replaced by the hydrogen-focused FreedomCAR initiative by the Bush administration in 2002 in an initiative to fund research too risky for the private sector to engage in, with the long-term goal of developing effectively carbon emission- and petroleum-free vehicles. It is important to note that the PNGV was cancelled largely because of the focus on environmental concerns as opposed to energy efficiency, which is the “policy in conflict.” The research program revealed that the energy efficiency goals could be met but only with diesel fuel as the principle fuel source. New and very stringent EPA emissions regulation came into effect toward the end of the PNGV program, which effectively killed the largely successful effort toward hyper fuel efficiency. The policy focused on the environment and not on energy security, which is the central argument in this thesis. It could be suggested that a relatively minor adjustment to the air quality emission standards of the EPA, and more importantly that of the CARB, would lead to rapidly marketing cars that would reach 100 MPG with a sizable reduction in harmful emissions. What is lacking is a rational and balanced public policy that considers both the environment and energy security within the same framework. Again, this situation is a homeland security imperative and the solution to two major public policy issues are within grasp with enlightened policy.

C. THE SHORT-TERM TECHNOLOGY SOLUTION

One possible solution is advanced full plug-in series drive diesel-electric hybrid electric vehicles that use a diesel Auxiliary Power Unit (APU) to maintain the charge in the batteries while underway. This small and inexpensive diesel can be run on a variety of biodiesel blends to further cut down on the oil component of the fuel. The unit can be plugged into a standard household circuit to charge overnight or can be charged from the grid at work or other locations where the car may be parked for two hours or more. Higher voltage charging units dramatically speed up the re-charge time. Most homes and businesses can inexpensively have 240V or 480V circuits installed to reduce charging time (Huntley, 2011).

This full plug-in series drive diesel-electric hybrid technology possesses numerous technological advantages that include the delivery of constant power for long periods of time, as well as suffering less wear while operating at higher efficiency. The diesel engine's high torque, combined with hybrid technology, substantially improved fuel mileage and engine cycling. Hybrids have far less engine revolutions per mile driven than do non-hybrid vehicles; thereby, increasing engine life. For the most part, diesel vehicles can use 100% pure biodiesel. Therefore, they can use but do not need petroleum at all for fuel (although mixes of biofuel and petroleum are more common and petroleum may be needed for lubrication and during winter months). Diesel-electric hybrid drive trains have begun to appear in commercial vehicles (particularly buses). As of 2013, no light duty diesel-electric hybrid passenger cars are currently available, although several prototypes exist. Peugeot is expected to produce a diesel-electric hybrid version of its 308 in late 2013/14 for the European market.

Volkswagen made a prototype diesel-electric hybrid car that achieved 120 MPG, but has yet to sell a hybrid vehicle. GM has been testing the Opel Astra diesel hybrid and Ford built the 65 MPG diesel electric hybrid Reflex using a less efficient parallel hybrid set up. No concrete dates have been suggested for these vehicles, but press statements have suggested production vehicles would

not appear before 2013 for the VW and GM models, and no word from Ford at all on any production plans.

Bosch GmbH is supplying hybrid diesel-electric technology to diverse automakers and models, including the Peugeot 308. Thus far, production diesel-electric engines have mostly appeared in mass transit buses with several agencies, including the Los Angeles County Metropolitan Transportation Authority, testing hybrid transit buses. It would seem that municipal buses would be the very best application of this hybrid technology because the operating envelope for city buses is ideal for maximizing the benefit from an electric hybrid. Every time a unit applies the brakes, it is recovering kinetic energy and converting it into stored electrical energy through regenerative braking. The continuous start-stop cycle of city transit buses make them ideal for capturing braking kinetic energy and reusing the power for acceleration. It should also be noted that the very large roof area of a city transit bus would make a nice platform for solar panels. Therefore, the state of the art hybrid transit bus could use both regenerative braking and solar panel to reduce fuel consumption dramatically. Many city transit buses are having their diesel engines slightly modified to run on CNG or liquefied natural gas (LNG) as gas is abundant in the United States and it would totally eliminate the need for oil in that particular bus fleet. It should also be noted that “nitrogen over hydraulic” accumulators are also a very good way to capture braking energy for a city transit bus. The recommended solution proposed in this thesis would call for the U.S. Department of Transportation (DOT), in their grant-funding program for local bus transit agencies, to require the use of some serious level of hybrid technology to be eligible for federal funding. The local agencies could use the technology as they see fit, but if they want federal dollars, they would need to apply the available modern technologies vigorously to reduce oil-based fuel consumption, and at the same time, they would be cleaning the air. Part of the cost for using this enhanced technology could reasonably and responsibly be passed on to the users of the transit system and the other beneficiaries. The city transit bus

industry is an ideal market niche in which advanced technology can be tested and applied to prove concepts in fuel conservation. The use of lighter weight materials in the construction of buses can also contribute to a reduction in fuel consumption. Fuel shut-off at stops would also be very important in terms of both fuel savings and cleaning the air, especially for the people waiting at the bus stop.

Another very important area for fuel savings in the city transit bus sector is in designing the operational profile of the system. Simple issues, such as moving to “far side stops” at intersections, combined with lane reentry priority, significantly increase overall system speed, which provides more passenger miles for the same fuel. This concept is a very low cost initiative that can yield significant fuel savings benefits and the U.S. DOT should ensure that local systems are using these techniques if they want federal grant funding support (Cowden, 2007).

Another important concept in the greening of the city transit bus system is that by fully engaging this new and earth friendly and homeland security friendly technology, more people will make the decision to use public transit as a choice of conscience. People want to do the right thing and making it obvious for them will increase transit ridership, and again, save fuel.

FedEx, along with Eaton Corp. in the United States and Iveco in Europe, have begun deploying a small fleet of hybrid diesel electric delivery trucks in their respective markets. As of October 2007, Fedex operated more than 100 diesel electric hybrids in North America, Asia, and Europe.

D. SOME DISADVANTAGES OF THIS NATIONAL POLICY

- Some changes in oil refining would be required
- Fluid Catalytic Cracking (FCC) produces a high yield of light products—gasoline and LPG, while hydro cracking or thermal cracking is a major source of jet fuel, diesel, naphtha and LPG. Therefore, some refineries may need to convert

- A more intrusive federal government encouraging certain consumer choices through a tax and rebate policy
- A more intrusive federal government in requiring fuel efficient actions by state and local governments, and possibly others, to be eligible for federal grant funding or contracts

E. MOST SIGNIFICANT ADVANTAGES OF DIESEL-HYBRID

- This policy choice is achievable today
- It does not require any changes to national vehicle fueling infrastructure (other than some changes to oil refineries' cracking process)
- Other choices, such as CNG, LPG, hydrogen, etc., all would require a trillion dollars in infrastructure changes—in other words, they are not technically feasible within the next two to three decades
- Keep in mind it has taken more than 100 years to build out today's fueling infrastructure throughout the United States

F. A POSSIBLE SOLUTION

Craft national policy to achieve a hyper-efficient automobile fleet within a decade. Replace the meager and ineffective CAFÉ standards with a program that will achieve fleet average mileage of 100 MPG in 10 years. To achieve these goals, the United States could do the following. See Table 4 for samples of incentives and disincentives.

- Create economic incentives and disincentives (Feebates) for hyper-efficient autos—a system designed to achieve the goals.
- A structured progressive scale for economic incentives and disincentives to achieve policy goals within a decade

Year	Very Low Mileage	Low Mileage	Good Mileage	Hyper Mileage
Base	20	30	40	50
1	25	35	45	55
2	30	40	50	60
3	35	45	55	65
4	40	50	60	70
5	45	55	65	75
6	50	60	70	80
7	55	65	75	85
8	60	70	80	90
9	65	75	85	95
10	70	80	90	100
	1st Registration Fee	1st Registration Fee	1st Registration Fee	1st Registration Fee
	Fed Chrg \$4,000	Fed Chrg \$2,000	Fed Chrg \$0	(\$6,000) Rebate
	Annual Reg. Fee	Annual Reg. Fee	Annual Reg. Fee	Annual Reg. Fee
	Fed Chrg \$400	Fed Chrg \$200	Fed Chrg \$0	(\$500) Rebate

(This table is an example of a possible fee and rebate program for initial registration and annual registration of vehicles. The actual fee and rebate schedule would possibly have more columns so it could account for smaller variation. The fees and rebates would be adjusted each year as allowed by the legislation and implemented by the administration.)

Table 4. Possible Fee and Rate Schedule

1. Ford Focus EOnetic Diesel to Get 67 MPG (But Only Available in Europe) (Richard, 2011)

The following short article is from Treehugger.com, and it shows how in Europe, which has not been deliberately opposed to diesel engines in passenger cars as has the United States, it is now common for autos to achieve significantly better than 55 MPG even without any type of hybrid system. The auto described as follows, a new Ford Focus, is equipped with a small four-cylinder diesel engine and it achieves very good mileage without the added cost of a hybrid system. Due to environmental policy, this car is not available in the United States.

With only minor reasonable reforms to emissions standards of EPA and the CARB, and safety standards of the Highway Safety Administration, the European specification autos could be offered in the United States. That reform of policy would certainly spread development and certification cost to reduce the risk and increase the probability of commercial success for the auto

manufacturers. With minor reforms to environmental policy and regulations, America could begin to wean itself off most foreign oil and do it quite rapidly.

The Ford Focus EConetic is what it calls “Europe’s most fuel-efficient compact car.” It is based on the regular Focus model, but it features a series of efficiency tweaks to push fuel consumption down to 3.5 liters/100km in the European cycle (that’s 67 MPG in U.S. gallons, though it would probably be a bit lower on the U.S. testing cycle).

The Focus EConetic is expected to emit less than 95g/km of CO₂ (certification will be done later this year) thanks to a “completely new 105PS version of the 1.6-litre Ford Duratorq TDCi diesel, which has been optimized for enhanced fuel efficiency, with a new injection system and turbocharger, enhanced charge cooling and further friction reduction measures.” This engine will produce 104-horsepower (77 kW).

The car’s aerodynamic performance has been tweaked. The coefficient of drag (CD) is 0.295, thanks in part to modifications to the underside, an Active Grille Shutter, low drag wheel covers, etc.

As for the transmission: “The 1.6-litre EConetic diesel is paired with Ford’s 6-speed Durashift manual transmission, which is also used in other new Focus models with the 1.6-litre TDCi engine. This transmission is a totally new high-efficiency design which has been optimized to eliminate frictional losses, and utilizes special low friction transmission oil.

Ford Auto-Start-Stop—Ford Auto-Start-Stop system automatically shuts down the engine when the vehicle is at idle—at a traffic light, for example—and restarts the engine when the driver wants to move off, saving the fuel wasted while the vehicle is stationary. This can reduce fuel consumption and CO₂ emissions by up to 10 per cent in urban driving.

Smart Regenerative Charging—Focus EConetic features an enhanced new version of this system, which increases the alternator output when the vehicle brakes or decelerates. This converts the kinetic energy of the vehicle into electric energy without having to use additional fuel. The ‘free’ electric current is used to recharge the battery, so that it can be used by the electrical systems at a later stage. An advanced battery management system continually monitors the charging status so that the regenerative charging feature can charge the battery in the optimal way.

Ford Eco Mode—Ford Eco Mode is a driver information system, which helps motorists to change their habits and adopt a more economical driving style, with potential fuel savings for many drivers of around 10 per cent. Sophisticated software—developed with the help of professional green driving tutors—monitors driving behavior, and provides the driver with clear feedback about their eco-driving performance, along with simple tips about how to save more fuel. A simple flower graphic in the instrument cluster display allows drivers to track their progress in the three key areas of gear shifting, anticipation and speed.

Shift Indicator Light—Shift Indicator Light can be a major support for drivers prioritizing economy. An indicator light, which is displayed in the instrument cluster, alerts drivers when they could reduce fuel consumption by shifting into a higher gear.

It should be available in Europe in early 2012, either as a 5-door sedan or a hatch. It will be made in Germany. (Richard, 2011)

2. Is GDiesel the Diesel Fuel of the Future? (Levine, 2010)

A sound future may be found in mixing cultivated or harvested crops with petroleum diesel fuel to create biodiesel as a way to reduce dependence on foreign oil. Likewise, it may be a reasonable way to proceed to add methane from landfills or this newest development of mixing petroleum diesel with natural gas to create GDiesel. According to the following short article, GDiesel has the capability of reducing straight diesel consumption by a third.

(From the Levine article in PickupTrucks.com of April 2010.)

Dr. Rudolf Gunnerman has created GDiesel, a new fuel for diesel engines that combines conventional ultralow sulfur diesel with natural gas, which is mostly methane. The result is a fuel blend that has cleaner emissions but costs less to produce than today's No. 2 diesel that is sold for use in cars and trucks. That is because natural gas helps GDiesel burn more completely than standard diesel during combustion, and it currently costs less than the equivalent amount of petroleum based diesel fuel.

Gunnerman's company, Advanced Refining Concepts, blends ultralow sulfur diesel and natural gas at a 2-1 ratio—a gallon of diesel and a half-gallon of natural gas—using a proprietary set of four metallic catalysts that facilitate process. The methane and

diesel fuel react chemically, with the diesel absorbing methane's component atoms, hydrogen and carbon.

In some cases, GDiesel is also said to yield up to a 30 percent improvement in fuel economy. It's also compatible with existing fuel storage and dispensing equipment and requires no modifications to vehicles or power-generating equipment.

ARC is in the final stages building a refining facility in Nevada that will be able to produce up to 100,000 gallons of GDiesel a day. In the future, smaller GDiesel refineries may be built near ready supplies of natural gas and methane, such as by a garbage dump or large farm, where methane can be harvested as a waste product.

Rudolf Diesel (the inventor of the Diesel engine more than 100 years ago) originally envisioned his engines would run on vegetable oil, but modern feedstock fuels have been unpopular because they use valuable cropland or aren't available in large enough quantities to drive down fuel prices. Rudolf Gunnerman's solution doesn't impact food supplies, and the U.S. has abundant supplies of natural gas. Perhaps the two Rudolfs a century apart point the way to diesel's future. (Levine, 2010)

3 Volvo Unveils Plug-in Hybrid Diesel V60: 124 MPG, 30 Electric Miles, AWD, 0-60 in 6.9 Seconds (Chambers, 2011)

Ahead of next week's Geneva Motor Show Volvo has taken the wraps off its latest plug-in project, the V60 PHEV. Calling it "three cars in one," Volvo has included just about everything but the kitchen sink for next generation car enthusiasts: an all-electric range of 30 miles using a 12 kWh lithium-ion battery, 124 MPG when driving in hybrid mode, a 2.4 liter turbocharged diesel engine, all-wheel drive using the electric motor for the rear wheels and the diesel engine for the front wheels, and a sport mode that combines both power sources for maximum performance resulting in a 0-60 mph time of 6.9 seconds.

The World's First Diesel-Electric Production PHEV

Just last week we were treated to the notion of a plug-in hybrid diesel-electric SUV in the form of a Land Rover prototype. Yet while the Land Rover is a one-off test model, the V60 PHEV, when it hits the market in 2012, will be the world's first diesel-electric PHEV—combining the efficiencies of both a diesel and electric drivetrain into one vehicle.

An offshoot of Volvo's efforts with the V70 PHEV prototype, the V60 PHEV will add to Volvo's growing list of plug-in vehicles, which include the production-intent C30 Electric.

What Mode Do You Want? The V60 PHEV Gives the Driver Complete Control

More than any other mass-market plug-in we've seen (believe it or not, only the BYD F3DM even comes close), the V60 PHEV gives the driver lots of control over driving mode. Want it to be all-electric? Just press a button and if the V60 has enough charge left you'll transfer into EV mode. In fact the V60 PHEV offers three modes:

PURE Mode: In this mode the V60 will use its 70 horsepower electric motor and 12 kWh battery (8 kWh usable) exclusively until the battery range is exhausted.

HYBRID Mode: This is the car's default mode upon start-up in which both the rear-wheel drive electric motor and the front-wheel drive 215 horsepower turbo diesel engine work together. In this mode Volvo claims the car can return 124 miles per gallon and emit less than 49 grams of CO₂ per kilometer. Keep in mind that it's hard to tell how realistic manufacturer's claims are, and 124 MPG does seem like a stretch for a vehicle like this.

POWER Mode: No this one isn't for control freaks, it's for performance freaks. In this mode the V60 meshes both the diesel and the electric drivetrains to provide maximum torque and power, resulting in a claimed 0-60 mph time of 6.9 seconds.

Volvo says the POWER mode is important for plug-in cars to go mainstream. "In order to get true car enthusiasts to think green, you have to offer them the opportunity to drive with low carbon dioxide emissions without taking away the adrenaline rush that promotes genuine driving pleasure," said Stefan Jacoby, President and CEO of Volvo Cars. "The V60 Plug-in Hybrid has all the traditional properties of a genuine sports wagon. What we've done is to spice it up with spearhead technology that allows the driver to choose: zero emissions, high-efficiency hybrid or full-on performance. Just select the mode that suits best."

The video below provides a good summary of all the various driving modes, as well as recharging capabilities.

It Will Hit the Market in 2012, But will it Come to the U.S.?

So what, another concept car you say? Nope. Volvo says the V60 PHEV will hit European showrooms in 2012. No word on whether or not it will reach the U.S., but given that the conventional V60 isn't available stateside and most automakers are reticent to sell conventional diesels here, chances seem slim.

Yet in an e-mail, Daniel Johnston, Product Communications Manager for Volvo Cars of North America, told PluginCars.com, "We never comment on future products for this market. However, we have not said 'no' to this project. First will be a roll out for Europe, we want to ramp up slowly with production to keep quality where it should be. Right now this car is diesel configuration which does not meet U.S. EPA standards, so from that side we need to work on an emission system or alternative for our market. If it came to this market, it would probably be a good year after it launched in other markets. It all depends on getting a U.S.-spec PHEV and still meeting European volume expectations."

But What's the Price?

Although there's no official word on pricing yet, a fully loaded V50 costs about \$39,000 in the U.S.. The V60 is not currently for sale in the States, but in Europe the V60 sells for about \$5,000 more than the V50. Add in at least \$8,000 worth of technology for the PHEV and now you're talking about a \$50-\$55,000 vehicle. I could be completely wrong, but I'd be willing to bet that'll be the price range if it ever comes to the U.S.. (Chambers, 2011)

4. Ford Focus Electric Will Offer Solar Home Option (Blanco, 2011)

Running an electric car on the power of the sun is many an EV enthusiast's dream. Ford isn't the first company to combine EV charging with solar energy, but it is trying to make it as easy as possible to go from driving on imported oil to using **extremely** local energy.

Through a new partnership with SunPower, Ford will offer a 2.5-kilowatt rooftop solar system to people who buy the upcoming Ford Focus Electric (and, later, the C-MAX Energi plug-in hybrid) that should, under the right conditions, create around 3,000 kWh of electricity a year. Put one of these on your house and, Ford says, you've got enough emission's free electricity to drive 1,000 miles a month. But, you say, I like to drive during the day, so how will my

car charge? As solar advocates know, the idea here is to offset the (potentially) coal-generated electricity your car charges with at night by feeding totally clean energy into the grid during the day. Until solar panels and EVs become so efficient that car top solar devices can power the car, this type of set-up is about as clean as you can get with a “normal” car. Ford’s even calling the new partnership “Drive Green for Life,” which is not inappropriate. The only problem? Adding the SunPower option to your Focus will cost you around \$10,000 (after federal tax credits).

SunPower has also worked with Toyota in the past, putting the largest single-roof solar installation in North America onto Toyota’s North America Parts Center California. (Blanco, 2011)

G. FROM 9/11 TO OSAMA BIN LADEN’S DEATH, CONGRESS SPENT \$1.28 TRILLION ON THE WAR ON TERROR (STEIN, 2011)

According to the Congressional Budget Office, it took 3,519 days since September 11, 2001, for U.S. forces to finally kill Osama bin Laden, the chief architect of the terrorist attacks that define that date.

During that time period, two wars were launched in the Middle East, each with the stated purpose of fulfilling the objectives of the larger “war” on terror. Bin Laden’s death has not stopped those operations. However, it does provide an end point to a politically contentious, emotionally exhausting and quite costly chapter.

According to a March 29, 2011 Congressional Research Service report, Congress has approved a total of \$1.283 trillion for “military operations, base security, reconstruction, foreign aid, embassy costs, and veterans’ health care for the three operations initiated since the 9/11 attacks.” Those three operations include Operation Enduring Freedom (OEF) Afghanistan; Operation Noble Eagle (ONE), providing enhanced security at military bases; and Operation Iraqi Freedom (OIF). The Congressional Budget Office—the nonpartisan accountant for lawmakers—estimates that over the next 10 years, total costs “could reach \$1.8 trillion by FY2021” (Stein, 2011).

This vast amount of money gives rise to the question of would the United States be better off if only a small portion of that money were invested in a program to get America off Middle Eastern oil. How could some of this money have been used to jump-start a plan to offer hyper-efficient autos to the American public under the Feebate program? How would that allocation of tax dollars contribute to homeland security?

H. DEVELOPMENT OF BIOFUELS COULD BE A MODEL FOR ECONOMIC DEVELOPMENT IN THE THIRD WORLD

Developing a robust BioFuels program in the United States could be a model for this kind of development in much of the third world, especially the nations in the tropical regions of the world where high sugar content crops can grow without irrigation. These largely poor and agrarian-based economies, primarily in the tropical latitudes all the way around the globe, could find new and expanding markets and good prices for their agricultural production to support growing BioFuels markets (Sardonis, 2010). Expanded opportunities for farmers in these tropical third world countries could lead to a better quality of life for their people, increase political stability, and reduce conflict. Is it better to send American dollars to the Middle East where at least some of that money eventually goes to terrorists or radical fundamentalist, or would it better to send those dollars to farmers in the third world to promote quality of life and stability? The answer to that question seems to be apparent on its face. With the foregoing in mind, it remains important to recognize that bio-fuels produce relatively little energy in relation to the time and effort put into producing them, which is not to say that biofuels are not part of the mid-term solution because they certainly are. However, neither the United States nor the world should count on biofuels to be a large part of the solution. It remains a priority to explore all sources of energy and to capitalize on all methods of energy conservation.

I. CONSTRUCTING A SOLUTION

In the end, this thesis turns to the task of crafting a possible solution to the policy dilemma identified in the body of the work. A possible solution to at least a portion of the oil dependency problem may be obtainable by structuring a set of crosscutting policy principles that inform the actions of government bureaus and guide the development of mutually supportive policy in the environmental and energy domains, and thus, enhance homeland security. These principles may state that any policy or regulations formulated in one domain, that could have impact on another, must be fully coordinated with the other domain through a structured and deliberate collaborative process. The goal of these guiding policy principles and the mutual consultation process is to ensure that policy in one area is not detrimental to the goals of another area—that agencies of the federal government, and of the states, are not working at cross-purposes. Policy in each area should be mutually supportive in an effort to achieve common goals and to ensure that actions and regulations are not unintentionally counterproductive. The solution may include the following.

- Offer a proposed solution in the form of a *Homeland Security Presidential Directive (HSPD)* that directs all federal departments and agencies to consult and coordinate fully with a principle office within the U.S. Department of Homeland Security and the U.S. DOE on any issue that may have an impact on U.S. energy dependence.
- Draft and propose legislation that would clearly make the federal government the sole arbiter of U.S. auto fuel efficiency standards and emissions standards.
- Craft federal and state fuel tax policies that incentivize and give an advantage to high energy density fuels, such as diesel, as well as to bio-fuels, such as biodiesel and ethanol, or methanol gasoline blends.
- Legislation to remove obstacles to importing biofuels.
- Propose a joint program of the U.S. Departments of Homeland Security and Energy that shall provide grants and other reasonable incentives to private industry to develop and market hyper-mileage vehicles through workable and proven technological solutions consistent with the policy proposals.

- Develop and propose a detailed and feasible timeline for achieving a national hyper-mileage fleet within 10 years.
- Use federal dollars only for hyper-mileage vehicles as specified in federal acquisitions solicitations for requests for proposals (RFPs). (This point is to have the federal government lead the way in transitioning to a hyper-mileage fleet.)
- Order the U.S. DOT that when providing grant funding to state and local government transportation agencies for the purpose of acquiring any type of vehicle, only hyper-mileage vehicles will be approved for such federal funding support (to include Federal Transit Administration (FTA) funding for city transit buses.)

X. CONCLUSION

Every American president over the last four decades has said America must end its dangerous dependence on unstable sources of foreign oil and that this issue was one of the most important facing the nation. In January 2009, President Obama stated the words below and his statement summarizes quite well the importance of this issue.

At a time of such great challenge for America, no single issue is as fundamental to our future as energy. America's dependence on oil is one of the most serious threats that our nation has faced. It bankrolls dictators, pays for nuclear proliferation, and funds both sides of our struggle against terrorism. It puts the American people at the mercy of shifting gas prices, stifles innovation and sets back our ability to compete. ("Energy Independence," 2003–2011)

—President Barack Obama
Address given at the White House
January 26, 2009

A. REVIEW OF THE RESEARCH QUESTION

At this point, it is good to restate the research question that this thesis attempts to inform.

- Does environmental policy conflict with homeland security goals?
- Do certain environmental policies at the federal, state or local levels of government unintentionally hinder or restrict the ability of the United States to achieve energy security?
- In what ways and in what degree could this conflict of policy be detrimental to the nation's homeland security?
- If environmental policy does conflict with homeland security goals, what kind of a national strategy should be engaged to facilitate the thorough and effective consideration of homeland security goals and objectives with respect to energy security when developing environmental policy?

The evidence presented in the preceding paragraphs of this thesis suggests that in fact environmental policy is in conflict with the goals of homeland security. This conflict is unintentional and it is largely unknown to the leaders of

the environmental movement and the government officials in charge of crafting and implementing policy. From the literature about the end of the PNGV program in 2002, it is clear that environmental policy has a major role in ending the successful PNGV program.

A proposal is offered in this thesis as a possible solution to the 40-year long problem of energy dependence and its impact on homeland security. The proposal to require mutual support and cooperation among and between the DOE, Department of Homeland Security, and the EPA is fundamental to the solution. The Feebate program to encourage hyper-mileage cars is another key part of the solution proposal as is the initiative to ensure that environmental regulations do not unreasonably impinge auto efficiency.

The United States must achieve real and sustainable energy security to reduce the threat of Islamic jihadists' international terrorism and to bring a level resilience required to sustain a secure homeland. As one among many parts of the nation's efforts going forward, and to achieve this goal of energy security and a reduced threat of international terrorism, the United States should consider overcoming a possible fundamental conflict between environmental policy and homeland security goals. Thus, the title of this inquiry—Policy in Conflict: Exploring the Conflict between Environmental Policy and Homeland Security Goals. With a greater understanding of the foundational causes of this potential policy conflict, and the interdependence of these policy spheres, it is then possible to craft solutions writ large, which is what this thesis is about. It is an effort to explore the root causes of the homeland security threat to the United States and to offer a potentially game changing solution to the dispute.

B. OPPORTUNITIES FOR FURTHER RESEARCH

One of the most important goals of this thesis effort is to encourage and promote further research into the issue of what is questioned as Policy in

Conflict: The Struggle between Environmental Policy and Homeland Security Goals. Opportunities for further research, to expand upon the ideas brought forth in this work, may be in the following areas.

- The relationship between environmental policy and homeland security policy
- The importance of energy policy in relation to homeland security
- The central role of energy security in relation to homeland security
- The need to fully coordinate and synthesize mutually supportive national policy among different policy domains
- Developing structures and processes designed to ensure adequate collaboration and full coordination between different policy domains to make certain that policies are mutually supportive
- Hyper-mileage technology
- Research into how tax policies on fuels and energy can incentivize the use of domestic energy and reduce oil consumption from the Middle East
- Broader aspects of the struggle between environmental policy and energy policy
- A broad analysis of ways to diminish animus toward the United States in the Muslim world

This thesis offers a possible way for all Americans to join in, participate, and become part of the answer to the great challenge of the time. All Americans can do their part in reducing the underlying causes of Islamic jihadist discontent with the West while at the same time strengthening the U.S. security posture. Most people simply do not pause to consider that each time they fill up the gas tank of their SUV, they are sending U.S. dollars to parts of the world where many of the people do not like the United States or even worse, may want to destroy the U.S. way of life because they consider it an offense to their religion or their national pride. Consequently, with the U.S. economy so utterly dependent on oil from the Middle East, and with that region's dominate influence on the price of oil, America has maintained a large—and unfortunately offensive to many—

footprint in the land of the holy prophet. The presence of the decadent western infidels in their land is one of the root causes of the hatred that gives rise to jihadist extremism and terrorism (Strozier & Terman, 2010).

The causes of this homeland security challenge lie in policy and solutions to the policy dilemma to be crafted to enhance security, and possibly, even reduce the potential for further conflict. Relatively minor adjustments to policy may offer a path forward that could be game changing.

In 2013, the United States is still the largest consumer of all commodities, goods, and services. However, China has recently overtaken the United States as the overall largest energy consumer to gain that somewhat dubious distinction. China consumed 2,252 million metric tons of oil-equivalent in 2009 in the form of crude, coal, natural gas, nuclear power, and renewable sources according to IEA Chief Economist Fatih Birol (Smith & Schmollinger, 2010). That amount exceeded the 2,170 million tons used by the United States. Grant Smith, in his July 2010 *Bloomberg* article also states, "It's one of those major turning points," Tilak Doshi, the chief economist at the Energy Studies Institute at the National University of Singapore, said in a phone interview. "China is growing by leaps and bounds. You've got OECD countries where you're talking about oil demand peaking, meanwhile the emerging countries like China and India will keep growing their energy demand."

- The importance of black gold (Howden, 2007)
 - A reduction of as little as 10% to 15% could cripple oil-dependent industrial economies. In the 1970s, a reduction of just 5% caused a price increase of more than 400%.
 - Most farming equipment is either built in oil-powered plants or uses diesel as fuel. Nearly all pesticides and many fertilizers are made from oil.
 - Most plastics, used in everything from computers and mobile phones to pipelines, clothing and carpets, are made from oil-based substances.
 - Manufacturing requires huge amounts of fossil fuels. The construction of a single car in the United States requires, on average, at least 20 barrels of oil.

- Most renewable energy equipment requires large amounts of oil to produce.
- Metal production—particularly aluminum—cosmetics, hair dye, ink and many common painkillers all rely on oil.

This thesis is about the struggle between environmental policy and homeland security. Central to the arguments presented herein is that continued dependence on dangerous sources of foreign oil is in some ways controllable, and therefore, this continuing dependence is a policy choice that has serious implications for the security of the American homeland. This continuing and even expanding reliance on oil from the Middle East and Gulf is dangerous, and it has inherent geostrategic and moral implications for the United States. First, it necessitates a large and very expensive presence of American troops in the region, which is a great insult and affront to many Muslims. This heavy footprint of the infidel in the land of the profit is infuriating to thousands of devout fundamentalist Muslims and is one of the major reasons for the current state of hostility. Secondly, America's continuing consumption of about \$300 billion of Middle Eastern oil each year transfers an enormous amount of wealth from the United States to the region. Some of those dollars go to individuals and organizations that seek to harm American interests or even engage in direct acts of terrorism against the United States or its allies. As stated earlier, the current Global War on Terror is the only time in history that one nation is paying for both sides of a war, which is reason enough to put an end to American money going to the oil sheiks of the region.

The huge transfer of wealth from the homeland to the Middle East negatively impacts the American economy. Hundreds of billions of American dollars have been spent on vast development projects over the past few decades but the problem is that these development projects have been built in the Persian Gulf—not in the United States. If that money were spent in the United States for domestic energy, what kind of impact would that have on the American economy? It is also important to recognize the domestic energy development and production are industries that have a strong multiplier effect for each dollar spent

in direct investment. Therefore, the real economic impact could be very substantial. The domestic taxes alone on the vast sums of money spent overseas might be enough to pay for a large percentage of an advanced public transit systems and a nationwide smart grid that would use energy much more efficiently. The positive development projects that could have been built in the United States with the money sent to the Gulf is beyond description. America could have become the world leader in alternative and renewable energy on a vast scale. How many other innovations could have been forthcoming if supported by the dollars sent to the Gulf? How many Americans would be working in good jobs of the future?

Lastly, but most importantly, thousands of American service members, and other U.S. personnel, have been placed in harm's way over the past decade and more because the leadership of the United States has concluded it is compelled to protect the nations' vital geostrategic interest in the Middle East. While other reasons exist for some American presence in the region, including the longstanding and unshakable commitment to assist in the defense of Israel, the obsession with western access to the vast oil resources of the Middle East and Gulf have largely shaped American policy in the region for decades. If the United States did not need to rely on oil from the Middle East or from anywhere outside of the North American Continent, that would be a game changer for America's geostrategic interest and foreign policy. It can also be assumed that many of the more radical Muslims in the region would display a reduced level of animus toward the United States if it could diminish or eliminate its heavy footprint in the region.

How does America go about attaining "energy security" to accomplish this reduction of physical presence in the Middle East? It is asserted in this thesis that some level of moderate reform in environmental policy may have a positive impact on the ability of the United States to achieve energy security. While numerous reasons exists for why the United States has failed to achieve energy

security over the past 40 years, it is asserted in this thesis that overly strict and inflexible environmental regulations are among the impediments to this immensely important goal.

Of the many reasons why America has not attained energy security, the conflict between environmental policy and homeland security goals is among the most important. Keep in mind that the largest single sector using oil is the transportation sector. Thus, substantial improvement in this area would have a major impact on overall energy dependence.

This study examined four policy options against six selection criteria to judge their efficacy in providing a solution to the energy dependency problem. The mutually coordinated policy initiative between environmental policy and energy policy appears to hold the greatest promise for success.

Among the scores of alternatives for moving rapidly to full plug-in series diesel-hybrids may be a sound, workable, and reasonable choice for vehicle transportation that can technically meet the goal of U.S. energy security within a realistic time frame and without major changes to national infrastructure that could cost upwards of a trillion dollars. This technology works; it is proven, and it is available in the short term. Uninformed and overly ridged public policy regarding the environment may stand in the way of at least partially contributing to the U.S. energy and homeland security advantages it would achieve.

This thesis attempts to investigate the possible linkages between the claims and the supporting evidence regarding Policy in Conflict: The Struggle between Environmental Policy and Homeland Security Goals. The study deconstructs the problem by showing how the nation does not currently have an adequate degree of energy security partly because it uses excessive amounts of petroleum-based motor fuels and much of this petroleum is imported from unstable areas of the world. It is also imported from nations in which at least some of the money goes to support radical Islamists. The study shows the linkage of not using available and proven technology including biodiesel hybrid

cars, and how this results in much higher than necessary petroleum consumption. The inquiry continues to show how the lack of hyper-mileage, bio-diesel hybrid cars is to some degree a result of CARB and EPA regulations on diesel emissions and how these state and federal regulations do not adequately consider or factor in broader homeland security goals.

The study also touches briefly on the continuing refusal of the United States to develop domestic energy capacity fully from this nation's abundant natural resources. With this reluctance to develop America's domestic resources and the impediments to hyper-efficient autos, the United States ends up largely paying for both sides of the Global War on Terror.

In the end, the question is which is a more effective and more efficient strategic tool in the Global War on Terror, a large and unbeatable conventional military or a nationwide fleet of hyper-efficient automobiles that average more than 100 MPG?

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